Interfacing Vortex® Devices to Video Codecs

Application Note

Polycom Installed
Voice Business Group
Revision I

September 2004

POLYCOM®

Video Voice Data Web

Connect. Any Way You Want.

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Polycom® iPower™ 600 Series

Connecting the iPower 600 Series Inputs and Outputs

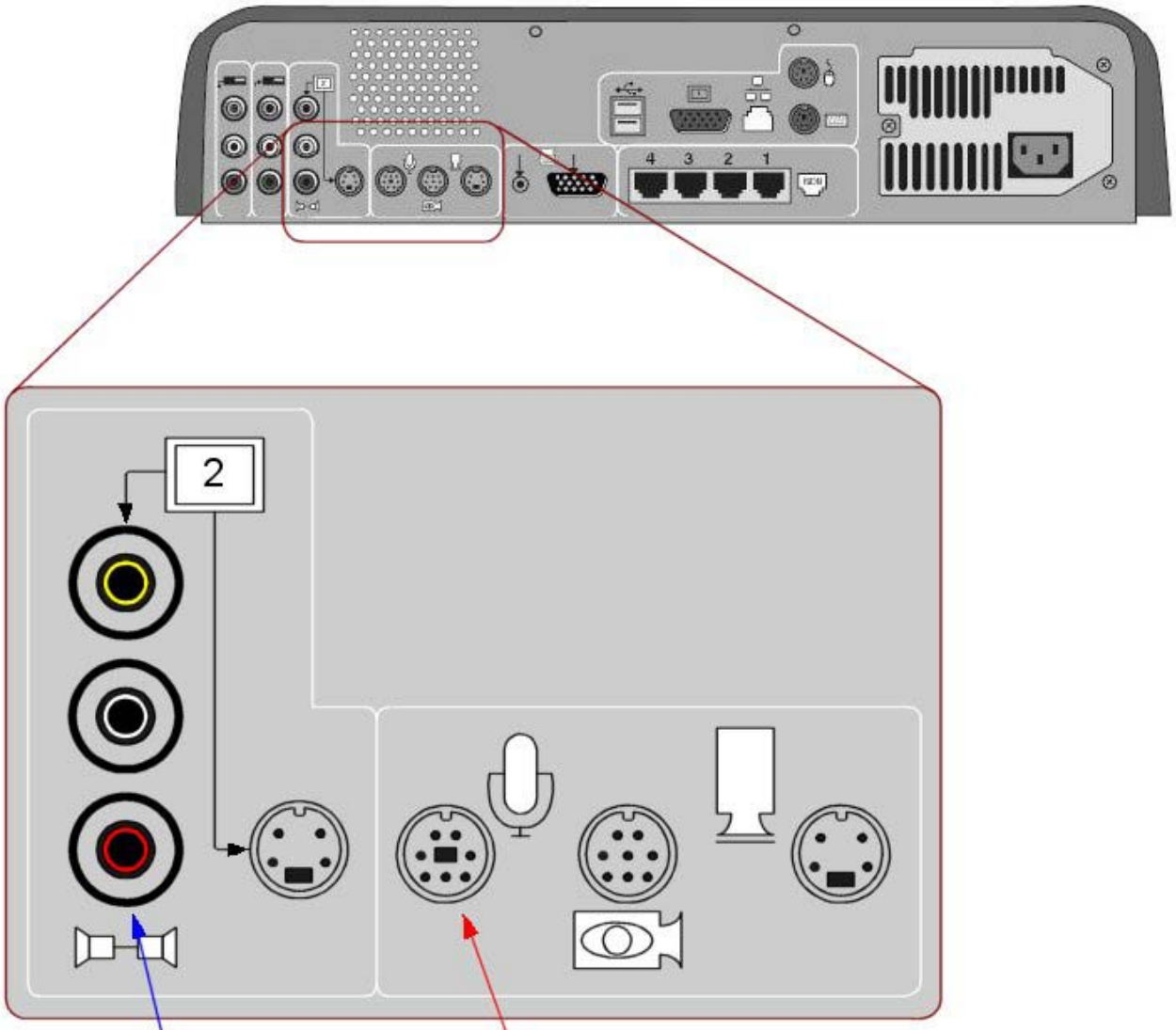
In order to send and receive audio to the Polycom iPower 600 Series codec, you need to observe the following procedure:

1. Connect one of the Outputs of the Vortex® device to the PowerMic Input of the codec. By default, Outputs A-C of the Vortex device are mix-minus versions of the Inputs' A-C signals.

You must use the PowerMic adapter cable in order to send audio into the codec. You may order one by contacing your Polycom reseller and requesting part number CBL-LINEAUDIO. You can also make your own cable. Click here for instructions.

2. Connect the line level output of the codec to one of the line level inputs of the Vortex device (Inputs A-D). You may use one of the Mic/Line level inputs, but you need to disable all processing on that input (AEC, AGC, NC, Automixer), disable Phantom Power, and set the input to line level versus the default of mic level.

Follow the diagram below to make the proper physical connections to the codec. Do not use any other audio inputs or outputs as they could cause an audio loopback to occur within the codec.



Output of Codec. This audio is what the far side is sending. It should not contain local audio. This output should be sent to an Input of the EF Device.

Input of Codec. This audio contains local microphones, program audio, and telephone hybrid audio (if available). This audio comes from the Output of the EF Device.

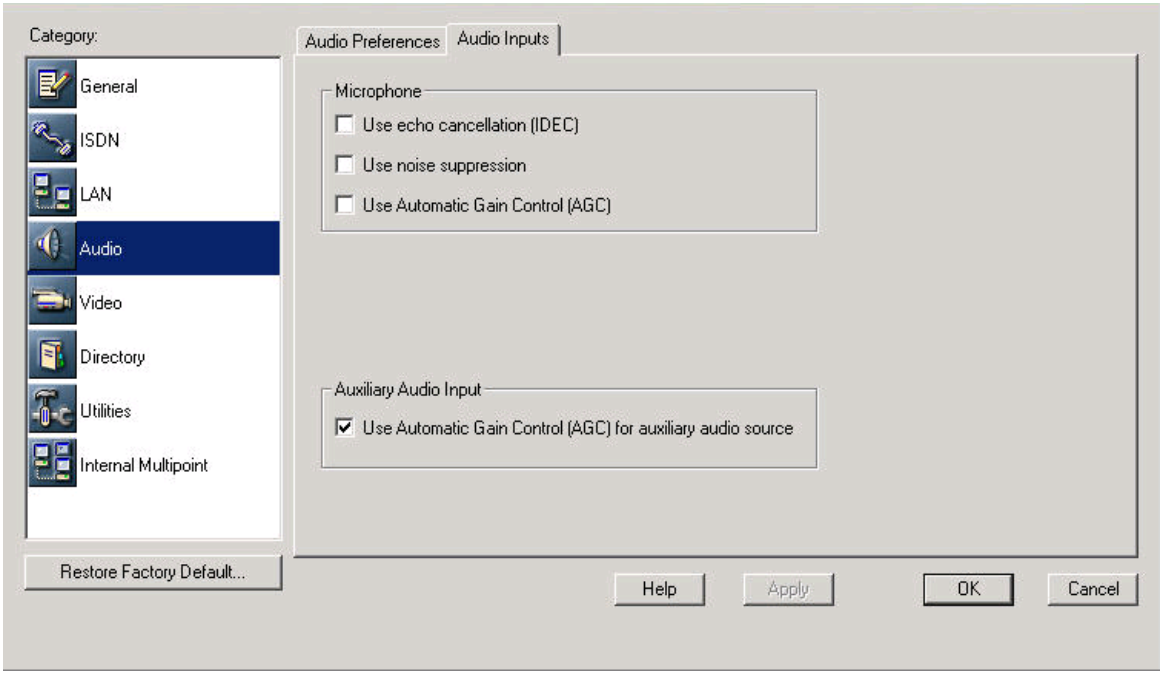
Please follow our instructions for wiring the Vortex device to the codec. Failure to do so may induce noise into the signals sent and received from the codec.

3. Raise the gain on the appropriate Input of the Vortex device to +10 dB.
4. Lower the gain on the appropriate Output of the Vortex device to -10 dB.

It is important to set the gain structure correctly so that you don't clip the input audio stage of the codec and that the Vortex device gets a good signal to perform processing with. The nominal input and output of the codec is .3 V rms. The nominal input and output of the Vortex device is .775 V rms. This equates to a difference of 8.24 dB between the two nominal levels. For simplicity, you may round that value to 10 dB.

SETTING THE AEC REFERENCE USING AN IPOWER 600

1. Open ADMINTOOLS (there should be a shortcut on the desktop), select the AUDIO Category, and click on the AUDIO INPUTS tab. De-select USE ECHO CANCELLATION, USE NOISE SUPPRESSION, and USE AUTOMATIC GAIN CONTROL (AGC)



2. Make sure that the Input to the Vortex device is assigned to the appropriate AEC Reference signal. Consult the Reference Manual for the Vortex device or the Help file in Conference Composer™ for more information.

3. Turn on the white noise generator in the Vortex device and assign it to the output that will be sent to the iPower. If the output gain of the Vortex device is set to -10, set the crosspoint to -55. This is required because if the input of the iPower does not detect a signal, it will turn on the built-in microphone. Since the internal echo canceller of the iPower is disabled, the far end caller will hear an echo.

   As an example, here are the Mic/Line Inputs and the Matrix Mixer layout of a EF2280 that is connected to a iPower 680 via Input / Output A:

MIC/LINE INPUTS

MATRIX MIXER

Safety Mute | Clear Matrix

OUTPUTS

INPUTS		IN	FDR	1 Ext Amp	2 -	3 -	4 -	5 -	6 -	7 -	8 -	A To iPower	B -	C -	D -	W -	X -	Y -	Z -	R1 Reference 1	R2 Reference 2	Mixer	AEC
	OUT			0	0	0	0	0	0	0	0	-10	0	0	0								
	NOM			On	On	On	On	On	On	On	On	On	On	On	On								
Table Mic 1	1	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R1
Table Mic 2	2	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R1
Table Mic 3	3	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R1
Table Mic 4	4	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R1
Table Mic 5	5	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R1
Table Mic 6	6	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R1
Table Mic 7	7	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R1
Table Mic 8	8	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	R1
From iPower	A	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-	B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-	D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-	PM0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-	PM1			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-	WM0			0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0		
-	WM1			0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0		
-	WM2			0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0		
-	XM0			0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0		
-	XM1			0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0		
-	XM2			0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0		
-	YM0			0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
-	YM1			0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
-	YM2			0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0		
-	ZM0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0		
-	ZM1			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0		
-	ZM2			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0		
Signal Generator	SG	0		0	0	0	0	0	0	0	0	-55	0	0	0	0	0	0	0	0	0		

Fixed | Not Muted | Muted | Automixer 1 | Automixer 2

Testing the Audio Inputs and Outputs

1. In order to run this test you simply press the Call Add Button as you would with any other test call, dial a string 0000000 (seven zeroes) and then press the Call Now Button. At this point the call will negotiate and you will see and hear yourself in a loopback.

2. Verify that you have enabled the white noise signal generator inside the Vortex device and have assigned it to the output of the Vortex device that will feed the input of the codec. Please see the section entitled "Setting the AEC Reference Using an iPower 600" and read Step 3.

Wiring from iPower to Vortex Device

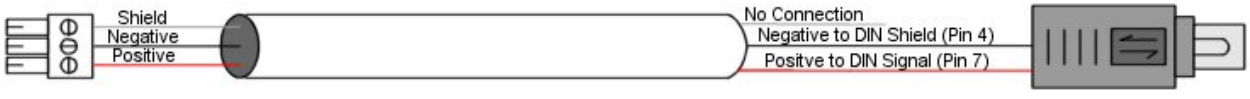
The inputs and outputs to the codec are unbalanced. We recommend keeping the cable from the Vortex device as short as possible to avoid any common-mode signals that may corrupt the audio.

Input to iPower from Output of Vortex Device (Using CBL-LINEAUDIO)

If you are using CBL-LINEAUDIO, connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

Input to iPower from Output of Vortex Device (Using Self-Made Cable)



Connect the Positive conductor of the Vortex device to Pin 7 of DIN connector and the Negative conductor of the Vortex device to Pin 4 of the DIN connector.

The shield of the cable is not connected.

Output of iPower to Input of Vortex Device

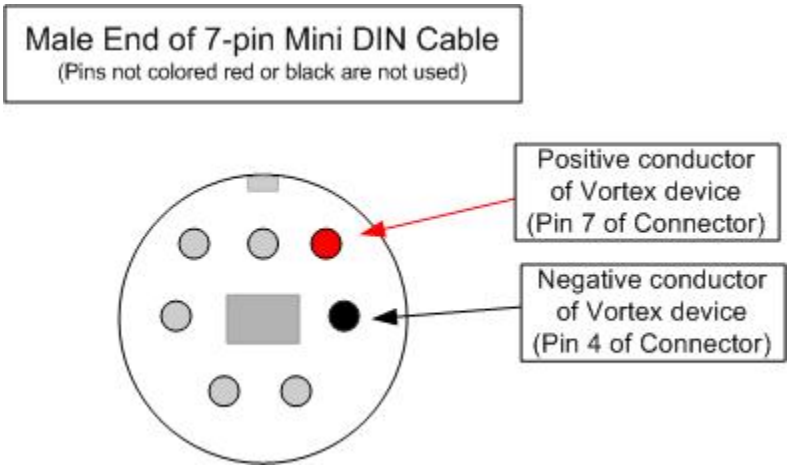
Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

PowerMic Cable Pinout

You can make your own PowerMic Interface Cable. You first need a 7-pin Mini DIN connector. Most electronic supply houses should carry this connector. Once you've obtained the connector, connect the Positive conductor from the Vortex device to Pin 7 of the DIN connector. Connect the Negative conductor from the Vortex device to Pin 4 of the DIN connector. Do not connect the shield of the cable to the DIN connector.

The PowerMic input is unbalanced in this configuration. We recommend keeping the cable from the Vortex device as short as possible to avoid any common-mode signals that may corrupt the audio.


Male End of 7-pin Mini DIN Cable
(Pins not colored red or black are not used)
Positive conductor of Vortex device (Pin 7 of Connector)
Negative conductor of Vortex device (Pin 4 of Connector)

Polycom iPower 900 Series

Connecting the iPower 900 Series Inputs and Outputs

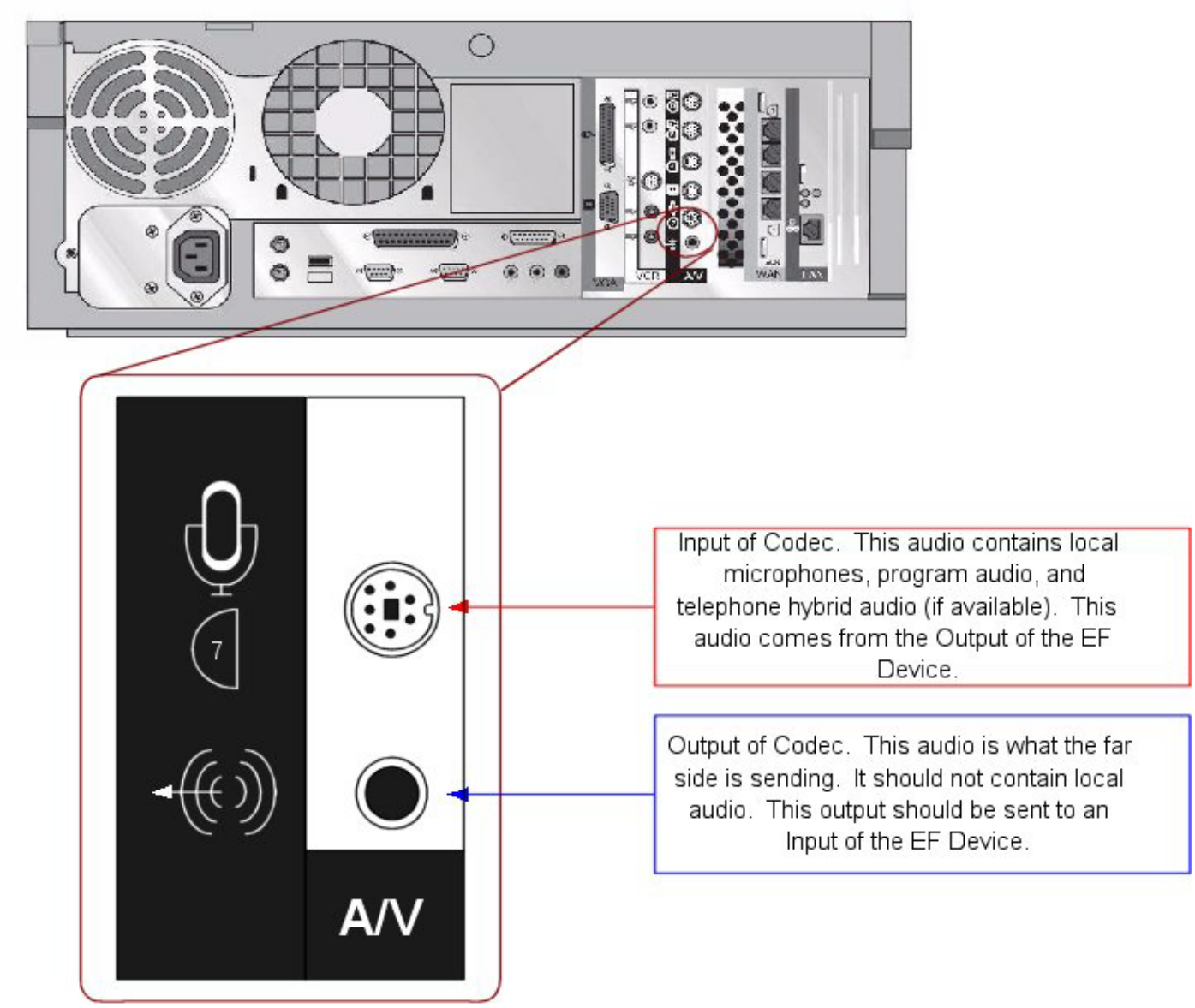
In order to send and receive audio to the Polycom iPower 900 Series codec, you need to observe the following procedure:

1. Connect one of the Outputs of the Vortex device to the PowerMic Input of the codec. By default, Outputs A-C of the Vortex device are mix-minus versions of the Inputs' A-C signals.

You must use the PowerMic adapter cable in order to send audio into the codec. You may order one by contacing your Polycom reseller and requesting part number CBL-LINEAUDIO. You can also make your own cable. See the section labeled "PowerMic Cable Pinout" for instructions.

2. Connect the line level output of the codec to one of the line level inputs of the Vortex device (Inputs A-D). You may use one of the Mic/Line level inputs, but you need to disable all processing on that input (AEC, AGC, NC, Automixer), disable Phantom Power, and set the input to line level versus the default of mic level.

Follow the diagram below to make the proper physical connections to the codec. Do not use any other audio inputs or outputs as they could cause an audio loopback to occur within the codec.


Input of Codec. This audio contains local microphones, program audio, and telephone hybrid audio (if available). This audio comes from the Output of the EF Device.
Output of Codec. This audio is what the far side is sending. It should not contain local audio. This output should be sent to an Input of the EF Device.
A/V

Please follow our instructions for wiring the Vortex device to the codec (See "Wiring from iPower to Vortex device"). Failure to do so may induce noise into the signals sent and received from the codec.

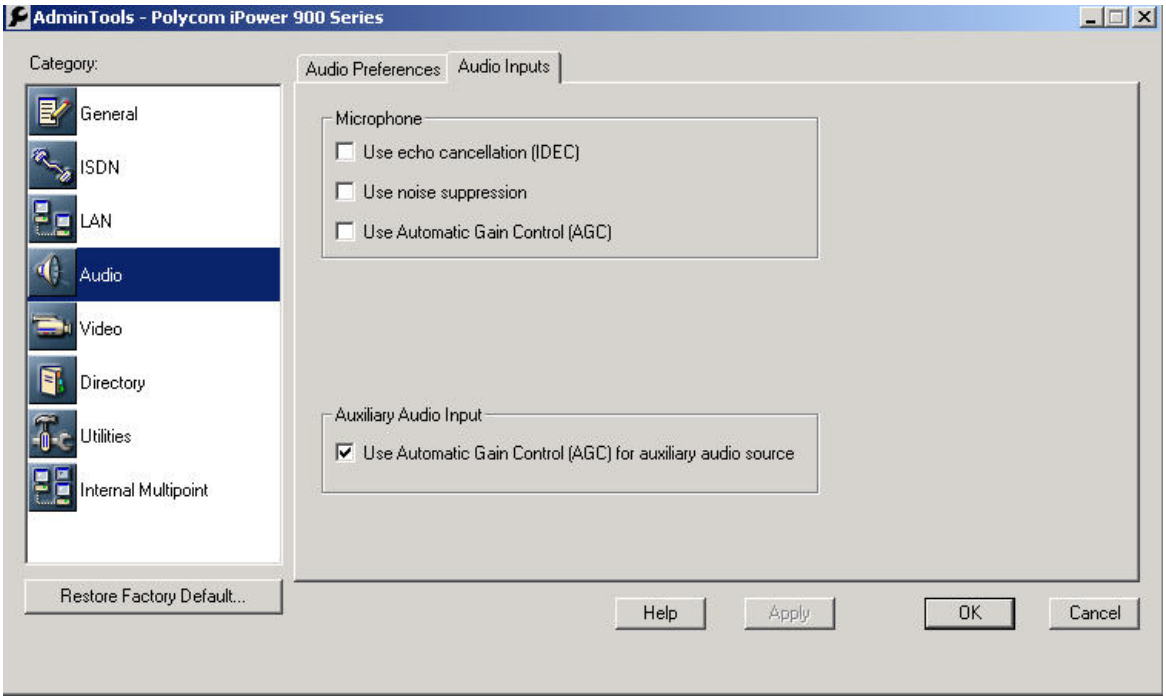
3. Raise the gain on the appropriate Input of the Vortex device to +10 dB.
4. Lower the gain on the appropriate Output of the Vortex device to -10 dB.

It is important to set the gain structure correctly so that you don't clip the input audio stage of the codec and that the Vortex device gets a good signal to perform processing

with. The nominal input and output of the codec is .3 V rms. The nominal input and output of the Vortex device is .775 V rms. This equates to a difference of 8.24 dB between the two nominal levels. For simplicity, you may round that value to 10 dB.

SETTING THE AEC REFERENCE USING AN IPOWER 900

1. Open AdminTools (there should be a shortcut on the desktop), select the Audio Category, and click on the Audio Inputs tab. De-select Use Echo Cancellation, Use Noise Suppression, and Use Automatic Gain Control (AGC)

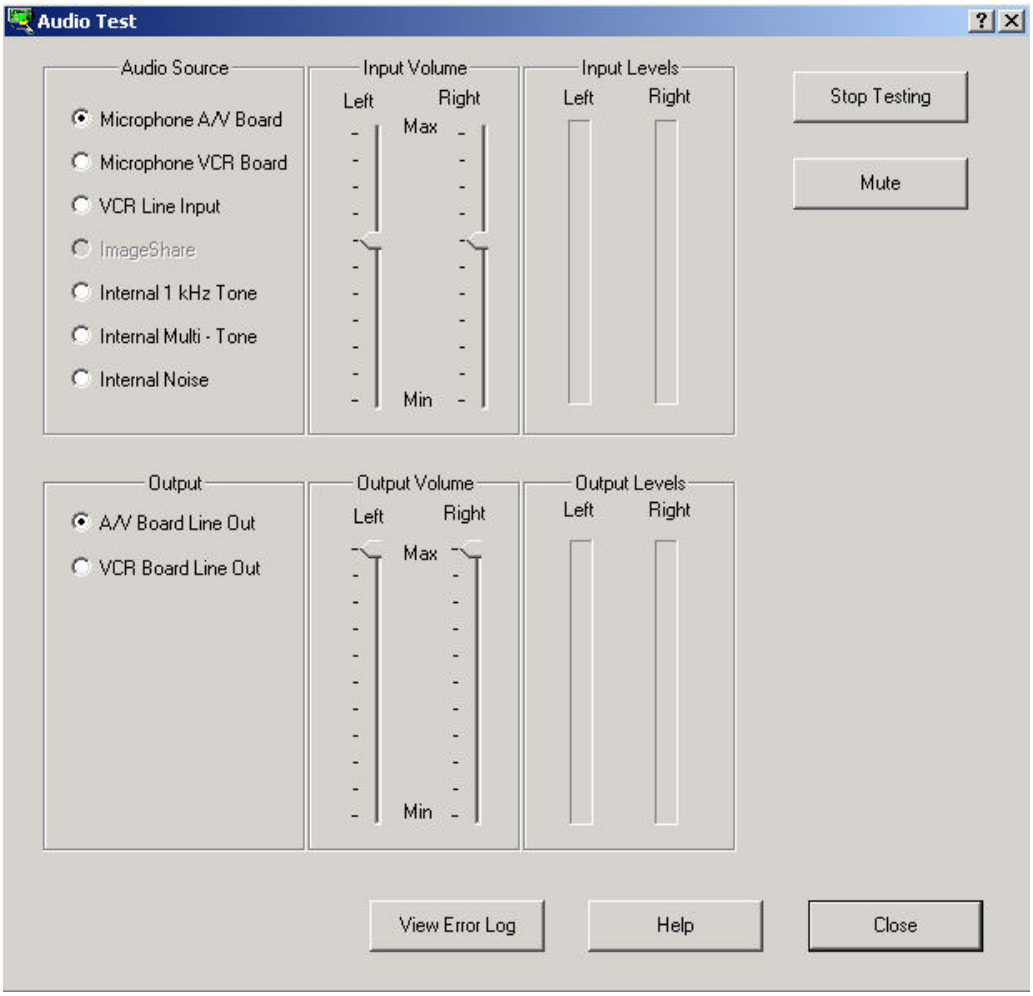


2. Make sure that the Input to the Vortex device is assigned to the appropriate AEC Reference signal. Consult the Reference Manual for the Vortex device or the Help file in Conference Composer for more information.

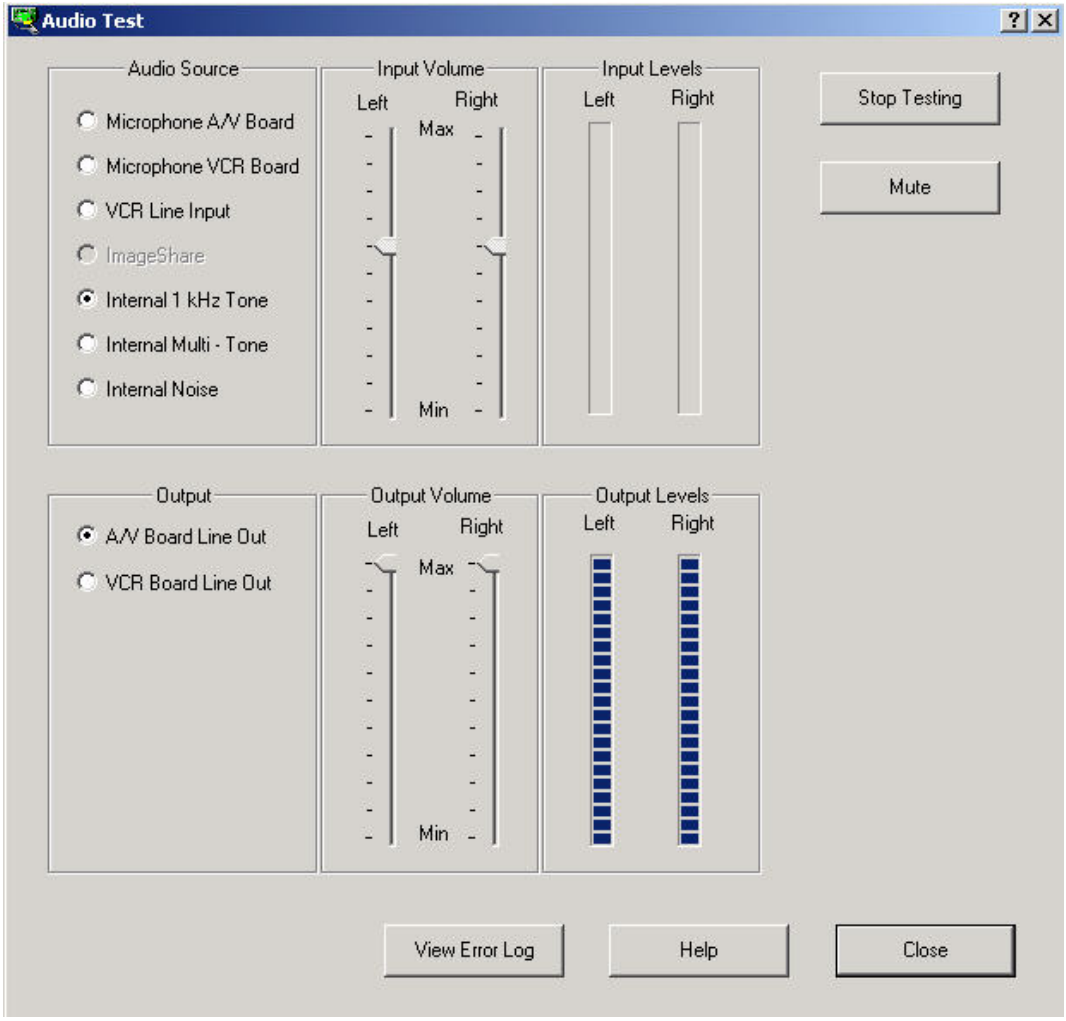
TESTING THE AUDIO INPUTS AND OUTPUTS

INPUT / OUTPUT TESTING

Open Hardware Diagnostics. The shortcut should be located in the PROGRAMS, POLYCOM IPOWER, ADMINISTRATOR INFORMATION folder. Select TEST AUDIO. To test the input to the codec, select MICROPHONE A/V BOARD. You should see level activity for the left channel only. Set the INPUT VOLUME to halfway.



To test the output of the codec, select INTERNAL 1 KHZ TONE and raise the OUTPUT VOLUME sliders to MAX. This represents approximately 0 dB.



LOOPBACK TESTING

In order to make a successful loopback test with the iPower 900 Series, either all ISDN lines must be connected or all ISDN lines must be disconnected.

If the ISDN lines are connected or disconnected, a reboot is needed prior to making a loopback call.

1. Place a call with "0000000" (seven zeroes) and click on "Call Now" button.
2. Once the call has finished connecting, you should see and hear yourself.

WIRING FROM IPOWER TO VORTEX DEVICE

The inputs and outputs to the codec are unbalanced. We recommend keeping the cable from the Vortex device as short as possible to avoid any common-mode signals that may corrupt the audio.

INPUT TO IPOWER FROM OUTPUT OF VORTEX DEVICE (USING CBL-LINEAUDIO)

If you are using CBL-LINEAUDIO, connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

INPUT TO IPOWER FROM OUTPUT OF VORTEX DEVICE (USING SELF-MADE CABLE)

Connect the Positive conductor of the Vortex device to Pin 7 of DIN connector and the Negative conductor of the Vortex device to Pin 4 of the DIN connector.

The shield of the cable is not connected.

OUTPUT OF IPOWER TO INPUT OF VORTEX DEVICE

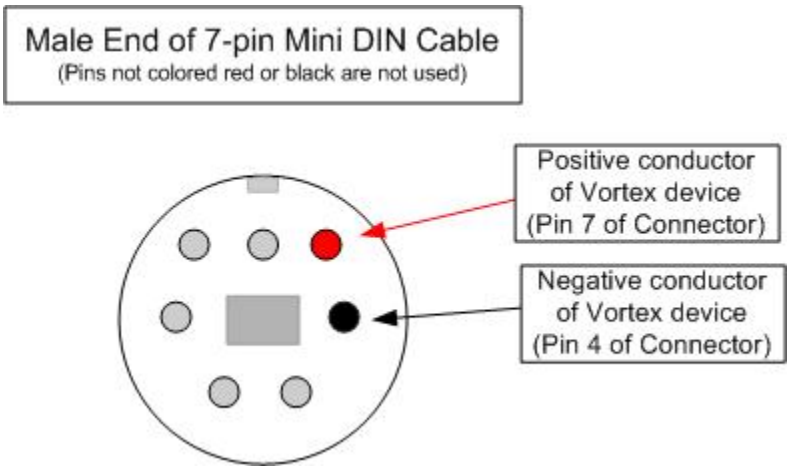
Connect the Positive conductor of the Vortex device to the Tip of the 3.5 mm connector. Connect the Negative conductor of the Vortex device to the Shield of the 3.5 mm connector. Do not connect the ring of the 3.5 mm connector to the Vortex device.

The shield of the cable is not connected.

POWERMIC CABLE PINOUT

You can make your own PowerMic Interface Cable. You first need a 7-pin Mini DIN connector. Most electronic supply houses should carry this connector. Once you've obtained the connector, connect the Positive conductor from the Vortex device to Pin 7 of the DIN connector. Connect the Negative conductor from the Vortex device to Pin 4 of the DIN connector. Do not connect the shield of the cable to the DIN connector.

The PowerMic input is unbalanced in this configuration. We recommend keeping the cable from the Vortex device as short as possible to avoid any common-mode signals that may corrupt the audio.


Male End of 7-pin Mini DIN Cable
(Pins not colored red or black are not used)
Positive conductor of Vortex device (Pin 7 of Connector)
Negative conductor of Vortex device (Pin 4 of Connector)

Polycom iPower 9000 Series

Connecting the iPower 9000 Series Inputs and Outputs

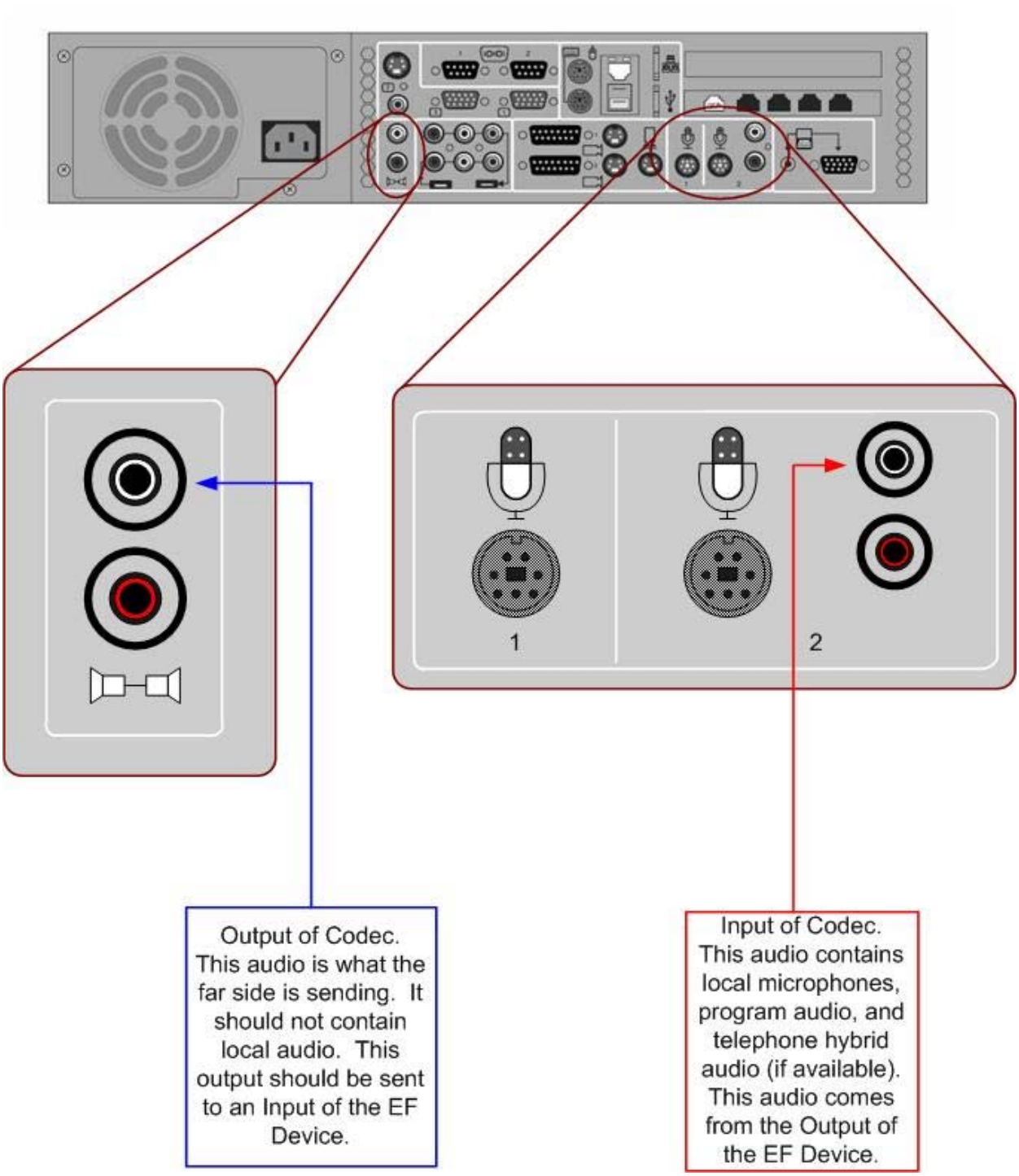
In order to send and receive audio to the Polycom iPower 9000 Series codec, you need to observe the following procedure:

1. Connect one of the Outputs of the Vortex device to the left channel (colored white) of Input 2. **Only use the left channel of Input 2**. By default, Outputs A-C of the Vortex device are mix-minus versions of the Inputs A-C signals.

Do not use the PowerMic Input to send audio into the codec.

2. Connect the left channel line level output of the codec (colored white) to one of the line level inputs of the Vortex device (Inputs A-D). You may use one of the Mic/Line level inputs, but you need to disable all processing on that input (AEC, AGC, NC, Automixer), disable Phantom Power, and set the input to line level versus the default of mic level.

Follow the diagram below to make the proper physical connections to the codec. Do not use any other audio inputs or outputs as they could cause an audio loopback to occur within the codec.


1
2
Output of Codec. This audio is what the far side is sending. It should not contain local audio. This output should be sent to an Input of the EF Device.
Input of Codec. This audio contains local microphones, program audio, and telephone hybrid audio (if available). This audio comes from the Output of the EF Device.

Please follow our instructions for wiring the Vortex device to the codec. Failure to do so may induce noise into the signals sent and received from the codec.

5. Raise the gain on the appropriate Input of the Vortex device to +10 dB.
6. Lower the gain on the appropriate Output of the Vortex device to -10 dB.

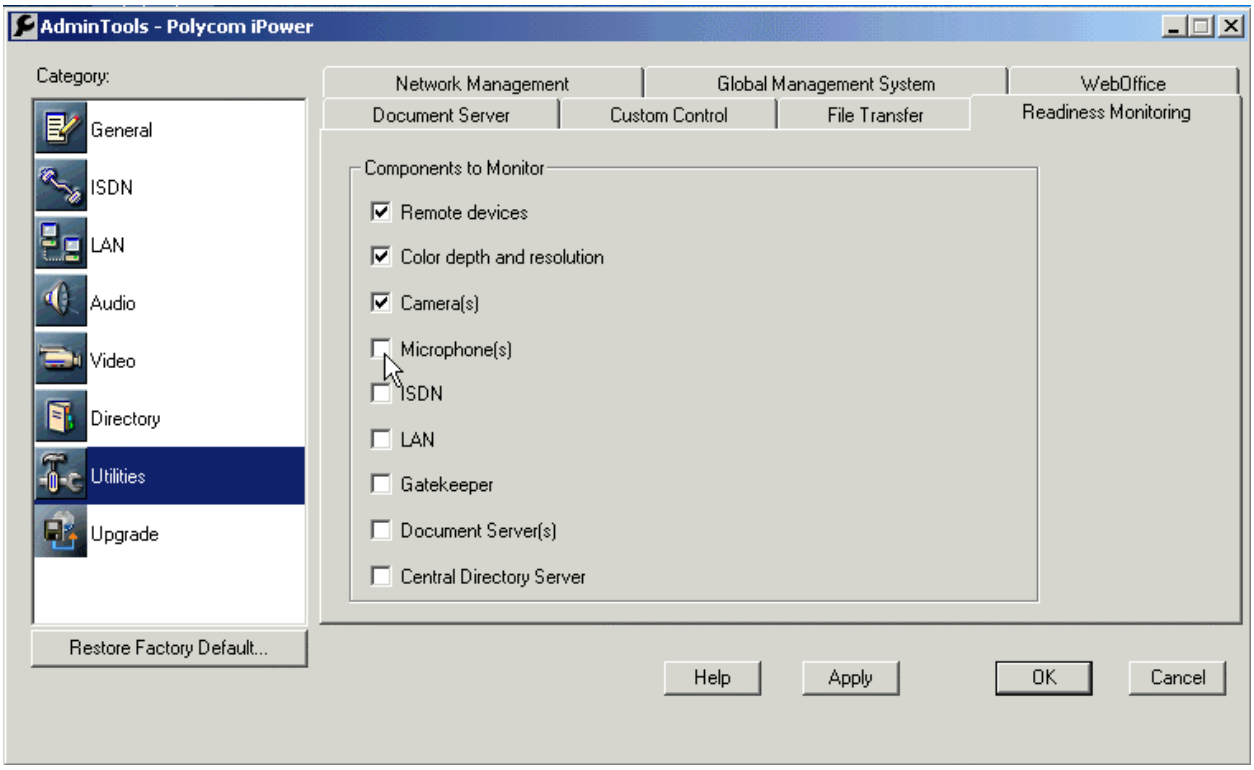
It is important to set the gain structure correctly so that you don't clip the input audio stage of the codec and that the Vortex device gets a good signal to perform processing with. The nominal input and output of the codec is .3 V rms. The nominal input and output of the Vortex device is .775 V rms. This equates to a difference of 8.24 dB between the two nominal levels. For simplicity, you may round that value to 10 dB.

DISABLING READINESS MONITOR MICROPHONE ERROR MESSAGES

After the codec is installed, the Readiness Monitor will alert you to the fact that a PowerMic is not plugged in to the codec (although the codec will be receiving a signal from the Vortex device):

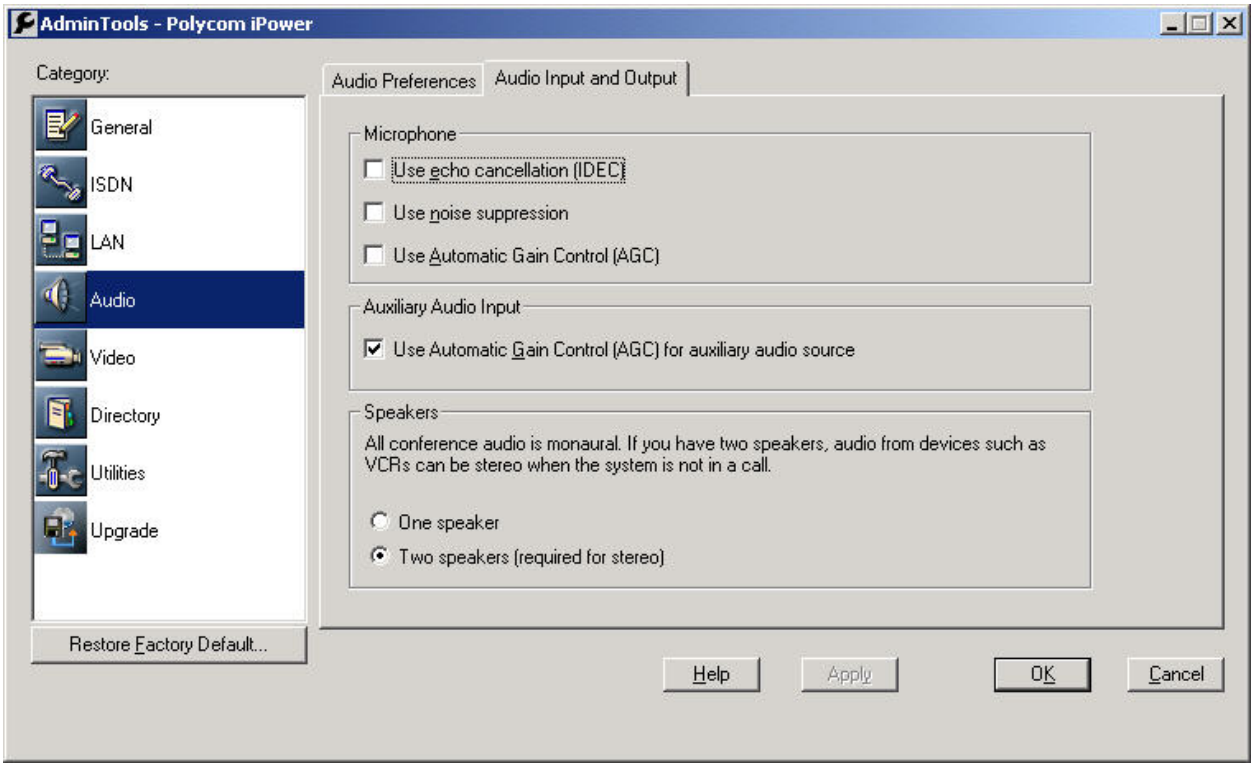
Microphone Unplugged
The microphone cable is unplugged. No audio will be available at the far-end system.
Suggestions
Make sure the microphone cable is securely plugged into the back of the system.
Please contact your system administrator for assistance.
OK

In order to disable this warning box, open ADMINTOOLS (there may be a shortcut on the desktop; otherwise, the shortcut should be located under the Administrator Information folder), select UTILITIES, and click on the READINESS MONITORING tab. De-select MICROPHONE(S):



SETTING THE AEC REFERENCE USING AN IPOWER 9000

1. Open ADMINTOOLS (there should be a shortcut on the desktop), select the AUDIO Category, and click on the AUDIO INPUTS tab. De-select USE ECHO CANCELLATION, USE NOISE SUPPRESSION, and USE AUTOMATIC GAIN CONTROL (AGC)

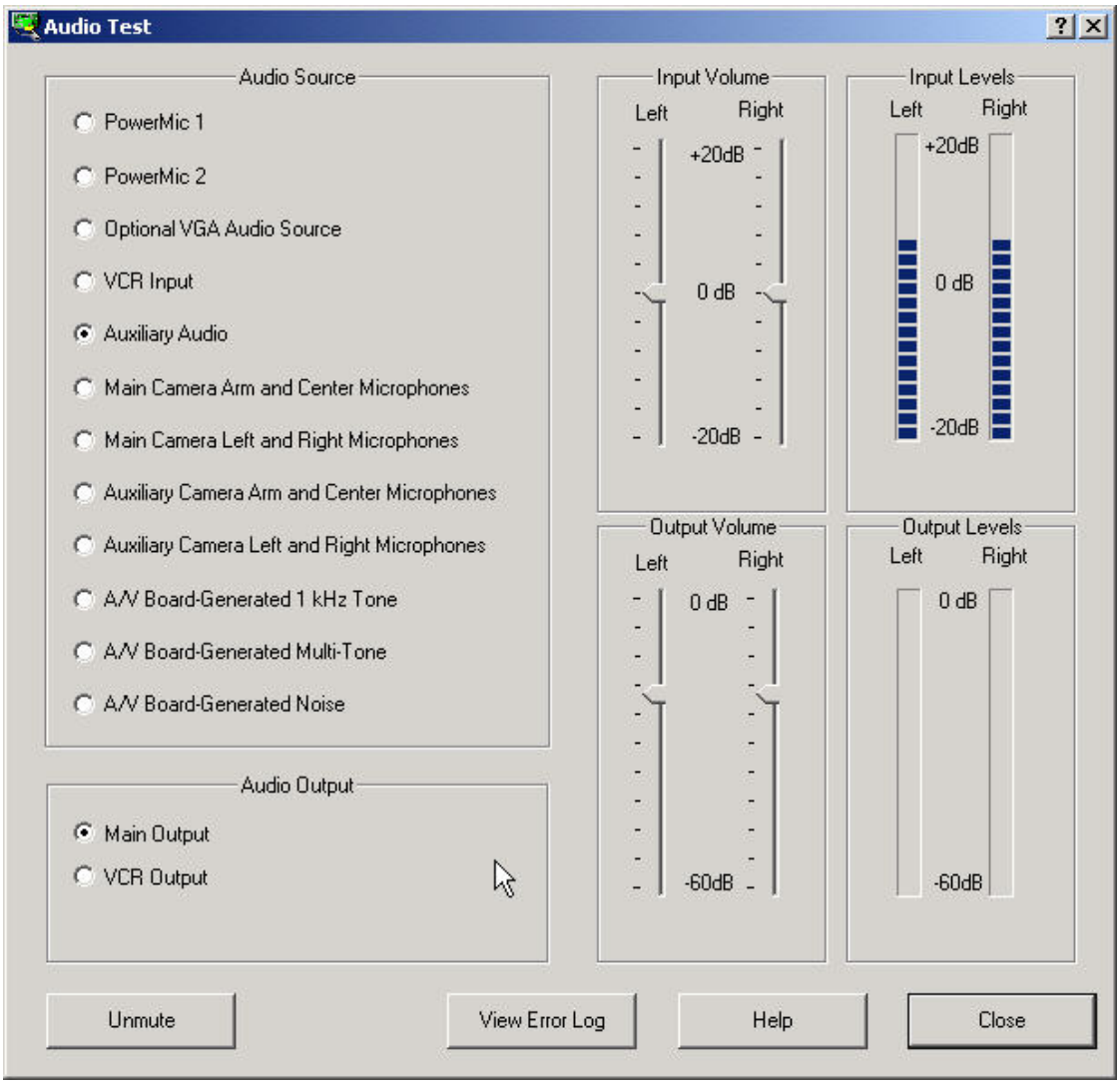


2. Make sure that the Input to the Vortex device is assigned to the appropriate AEC Reference signal. Consult the Reference Manual for the Vortex device or the Help file in Conference Composer for more information.

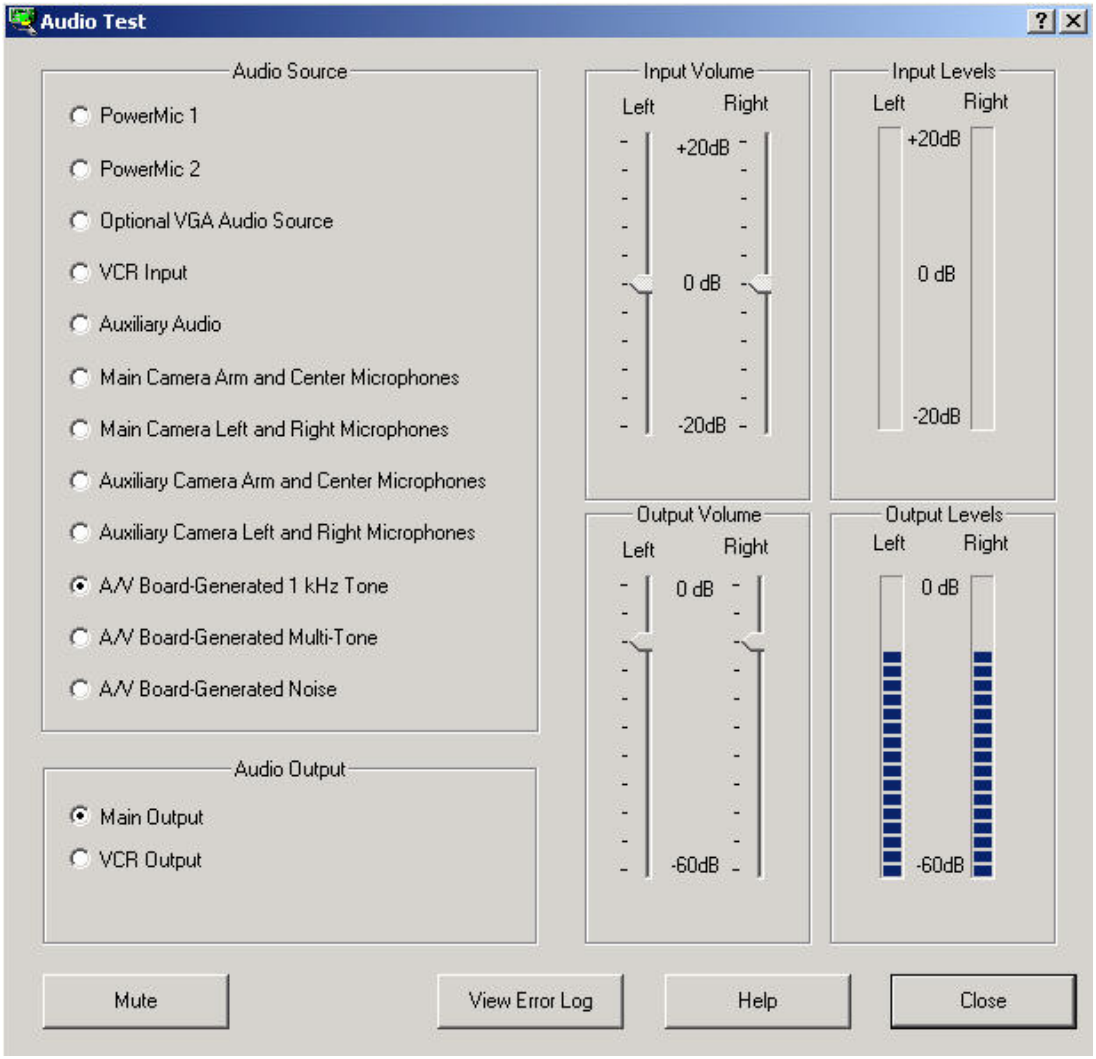
TESTING THE AUDIO INPUTS AND OUTPUTS

INPUT / OUTPUT TESTING

Open Hardware Diagnostics. The shortcut should be located in the PROGRAMS, POLYCOM IPOWER, ADMINISTRATOR INFORMATION folder. Select TEST AUDIO. To test the input to the codec, select AUXILIARY AUDIO. You should see level activity for the left and right channels. Set the INPUT VOLUME to halfway.



To test the output of the codec, select A/V BOARD-GENERATED 1 KHZ TONE and raise the OUTPUT VOLUME sliders so that they are even with the third tick mark from the top. This represents approximately -12 dB.



LOOPBACK TESTING

In order to run this test you simply press the Call Add Button as you would with any other test call and you dial a string 0000000 (Seven Zeros) and then press the Call Now Button. At this point the call will negotiate and you will see and hear yourself in a Loopback.

WIRING FROM IPOWER TO VORTEX DEVICE

The inputs and outputs to the codec are unbalanced. We recommend keeping the cable from the Vortex device as short as possible to avoid any common-mode signals that may corrupt the audio.

INPUT TO IPOWER FROM OUTPUT OF VORTEX

Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

OUTPUT OF IPOWER TO INPUT OF VORTEX DEVICE

Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

Polycom ViewStation® SP / SP384

General Information

The ViewStation SP / SP384 does not have a separate mixer input unlike the other ViewStation products. As a result, the audio that is sent into the VCR input will be routed to the Monitor output of the ViewStation SP / SP384. This will cause the local side of the video call to hear their audio via the local loudspeakers. Because of this limitation, we do not recommend the use of the ViewStation SP / SP384 with Vortex Devices.

Polycom ViewStation 128 / H.323 / MP / 512

Connecting the ViewStation 128 / H.323 / MP / 512 Inputs and Outputs

In order to send and receive audio to the Polycom ViewStation 128, H.323, MP, or 512 codec, you need to observe the following procedure:

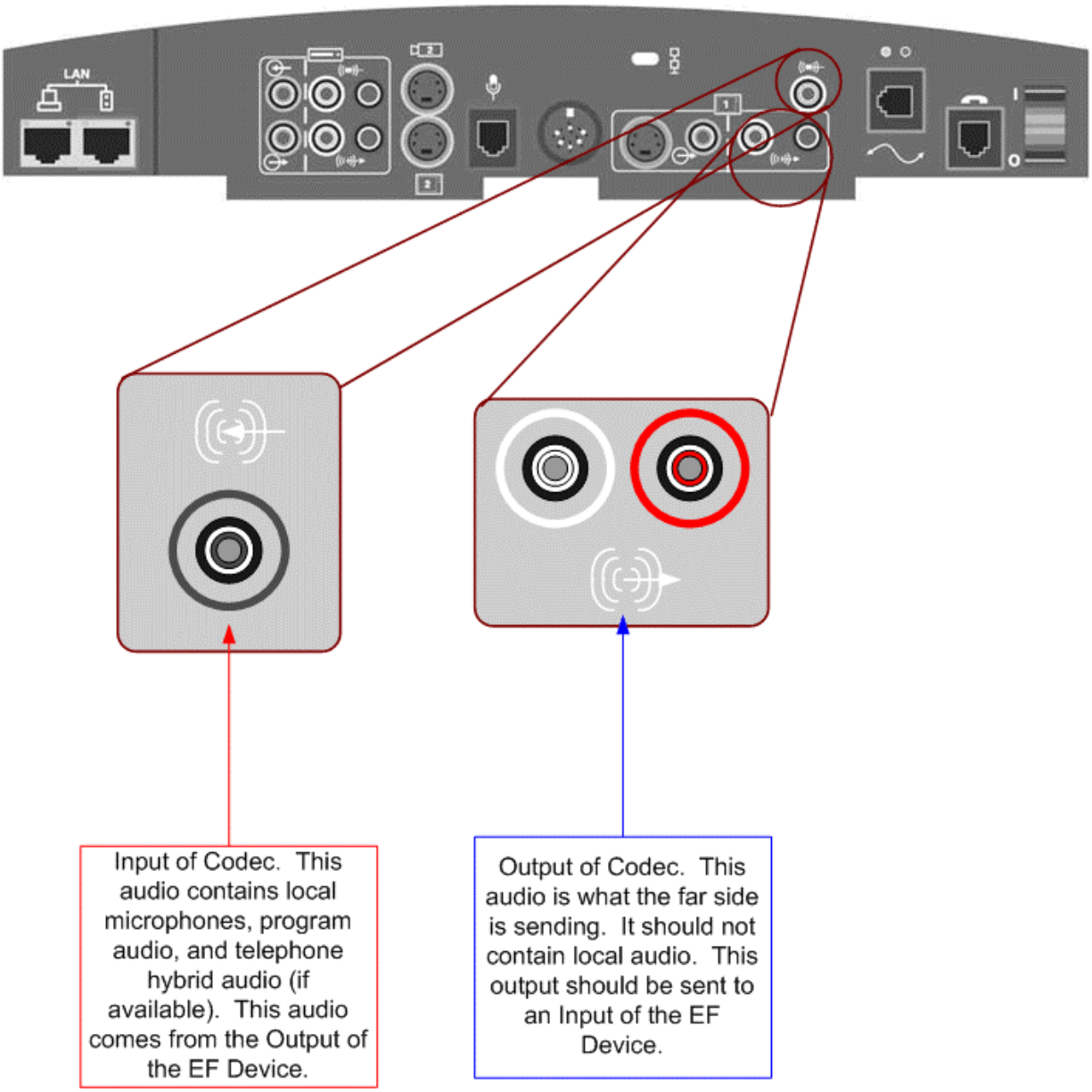
1. Make sure that the ViewStation codec has firmware version 7.5 or higher installed in it. You can find this information on the System Info page.

We do not recommend using a ViewStation 128, H.323, MP, or 512 codec with a Vortex device unless the ViewStation has firmware version 7.5 or higher because the internal echo canceller of the ViewStation could not be disabled in previous versions.

2. Connect one of the Outputs of the Vortex device to the mixer input of the codec. By default, Outputs A-C of the Vortex device are mix-minus versions of the Inputs A-C signals.

3. Connect the auxiliary line level output of the codec to one of the line level inputs of the Vortex device (Inputs A-D). You may use one of the Mic/Line level inputs, but you need to disable all processing on that input (AEC, AGC, NC, Automixer), disable Phantom Power, and set the input to line level versus the default of mic level.

Follow the diagram below to make the proper physical connections to the codec. Do not use any other audio inputs or outputs as they could cause an audio loopback to occur within the codec.


LAN
Input of Codec. This audio contains local microphones, program audio, and telephone hybrid audio (if available). This audio comes from the Output of the EF Device.
Output of Codec. This audio is what the far side is sending. It should not contain local audio. This output should be sent to an Input of the EF Device.

You may connect either the left or the right channel of the auxiliary line level output to the Vortex device. Any audio that is sent from the far side will be monaural.

Please follow our instructions for wiring the Vortex device to the codec (See "Wiring from ViewStation 128/H.323/MP/512 to Vortex device"). Failure to do so may induce noise into the signals sent and received from the codec.

3. Raise the gain on the appropriate Input of the Vortex device to +10 dB.
4. Lower the gain on the appropriate Output of the Vortex device to -10 dB.

It is important to set the gain structure correctly so that you don't clip the input audio stage of the codec and that the Vortex device gets a good signal to perform processing with. The nominal input and output of the codec is .3 V rms. The nominal input and output of the Vortex device is .775 V rms. This equates to a difference of 8.24 dB between the two nominal levels. For simplicity, you may round that value to 10 dB.

SETTING THE AEC REFERENCE USING A VIEWSTATION 128 / H.323 / MP / 512

1. Connect a monitor to Output 1 of the codec. By default, the composite output is enabled and the S-Video output is disabled.
2. Go to SYSTEM INFO, ADMIN SETUP, PHONE AUDIO, and check the ECHO CANCELLER option. Ignore the warning that is displayed on the screen about disabling the echo canceller and select OK.
3. Once that is completed, make sure that the Input to the Vortex device is assigned to the appropriate AEC Reference signal. Consult Reference Manual for the Vortex device or the Help file in Conference Composer for more information.

Testing the Audio Inputs and Outputs

1. Go to System Info, Admin Setup, Phone Audio, and check the Echo Canceller option.

You must enable the codec's internal echo canceller in order for the audio meter described in Step 2 to work properly.

2. Go to System Info, Diagnostics, Audio, Audio Meter and then speak into one of the microphones. Your level should be around 0 on the meter. You may also use the loop-back feature to listen to your own audio in the local room. That feature is under System Info, Diagnostics, Near End Loop.
3. Go to System Info, Diagnostics, Audio, Generate Tone to listen to a codec-generated 1 kHz tone.
4. Go to System Info, Admin Setup, Phone Audio, and **un-check** the Echo Canceller option.

Wiring from ViewStation 128 / H.323 / MP / 512 to Vortex Device

The inputs and outputs to most codecs are unbalanced. We recommend keeping the cable from the Vortex device as short as possible to avoid any common-mode signals that may corrupt the audio.

Input to ViewStation codec from Output of Vortex Device

Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

OUTPUT OF VIEWSTATION CODEC TO INPUT OF VORTEX DEVICE

Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

TIPS FOR VIEWSTATION 128 / H.323 / MP / 512

1. The volume control for the ViewStation codec controls the incoming far side audio and the local tone generator. It does not, however, control the sound effects inside the units such as incoming call ring and the female speech that occurs when you dial a number. This is important to note because if the volume control is very low, it may appear that the codec audio is operating correctly because the sound effects are still generated and will be heard in the local room. However, when a call is connected, the local side may not hear the far side because the local volume control is too low. Since the local participants heard the sound effects audio at a normal level, it may not be obvious that the volume control is set too low.

   The sound effects volume control can be adjusted in the SYSTEM INFO, ADMIN SETUP, PHONE AUDIO page.

2. If the ViewStation codec is turned off either through the power switch or unplugged from the wall while the codec is still connected to the Vortex device via the input and output audio cables, a loopback will occur in the codec. This means that a portion of the audio signal that is sent to the codec from the Vortex device will be coupled into the signal that is sent from the codec to the Vortex device. This will cause the local room to hear a reinforced version of their own speech via the local room loudspeakers. Our recommendation is to leave the codec power on all the time; however, if the codec must be powered down, we recommend muting either the output channel of the Vortex device that will feed the input of the codec or the input channel of the Vortex device that is connected to the output of the codec.

Polycom ViewStation EX

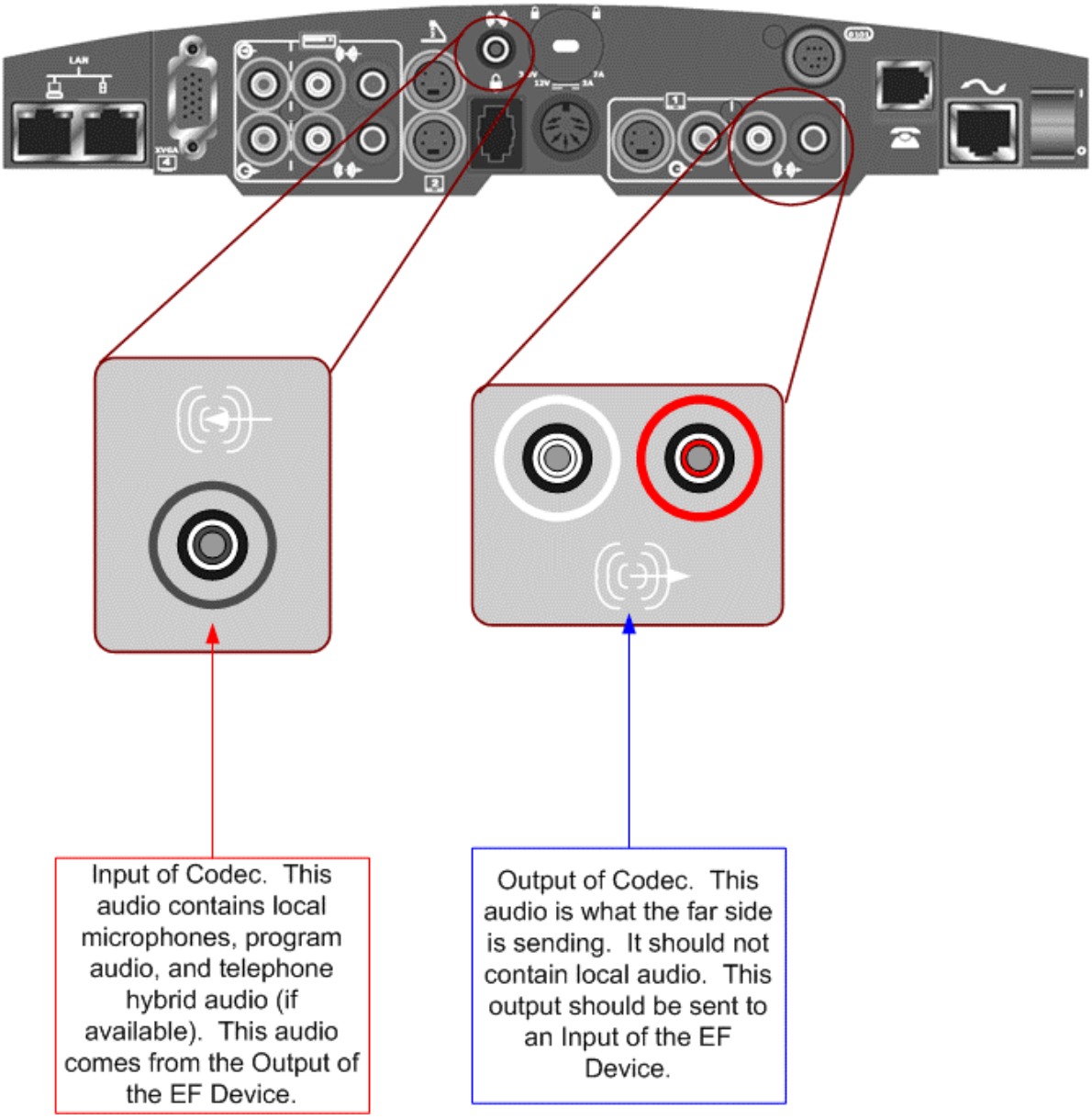
Connecting the ViewStation EX Inputs and Outputs

In order to send and receive audio to the Polycom ViewStation EX codec, you need to observe the following procedure:

2. Connect one of the Outputs of the Vortex device to the mixer input of the codec. By default, Outputs A-C of the Vortex device are mix-minus versions of the Inputs A-C signals.

4. Connect the auxiliary line level output of the codec to one of the line level inputs of the Vortex device (Inputs A-D). You may use one of the Mic/Line level inputs, but you need to disable all processing on that input (AEC, AGC, NC, Automixer), disable Phantom Power, and set the input to line level versus the default of mic level.

Follow the diagram below to make the proper physical connections to the codec. Do not use any other audio inputs or outputs as they could cause an audio loopback to occur within the codec.


Input of Codec. This audio contains local microphones, program audio, and telephone hybrid audio (if available). This audio comes from the Output of the EF Device.
Output of Codec. This audio is what the far side is sending. It should not contain local audio. This output should be sent to an Input of the EF Device.

You may connect either the left or the right channel of the auxiliary line level output to the Vortex device. Any audio that is sent from the far side will be monaural.

Please follow our instructions for wiring the Vortex device to the codec (See "Wiring from ViewStation EX to Vortex device"). Failure to do so may induce noise into the signals sent and received from the codec.

5. Raise the gain on the appropriate Input of the Vortex device to +10 dB.

6. Lower the gain on the appropriate Output of the Vortex device to -10 dB.

It is important to set the gain structure correctly so that you don't clip the input audio stage of the codec and that the Vortex device gets a good signal to perform processing with. The nominal input and output of the codec is .3 V rms. The nominal input and output of the Vortex device is .775 V rms. This equates to a difference of 8.24 dB between the two nominal levels. For simplicity, you may round that value to 10 dB.

SETTING THE AEC REFERENCE USING A VIEWSTATION EX

4. Connect a monitor to Output 1 of the codec. By default, the composite output is enabled and the S-Video output is disabled.
5. Go to SYSTEM INFO, ADMIN SETUP, PHONE AUDIO, and check the ECHO CANCELLER option. Ignore the warning that is displayed on the screen about disabling the echo canceller and select OK.
6. Once that is completed, make sure that the Input to the Vortex device is assigned to the appropriate AEC Reference signal. Consult Reference Manual for the Vortex device or the Help file in Conference Composer for more information.

TESTING THE AUDIO INPUTS AND OUTPUTS

2. Go to SYSTEM INFO, ADMIN SETUP, PHONE AUDIO, and check the ECHO CANCELLER option.

You must enable the codec's internal echo canceller in order for the audio meter described in Step 2 to work properly.

5. Go to SYSTEM INFO, DIAGNOSTICS, AUDIO, AUDIO METER and then speak into one of the microphones. Your level should be around 0 on the meter. You may also use the loop-back feature to listen to your own audio in the local room. That feature is under SYSTEM INFO, DIAGNOSTICS, NEAR END LOOP.
6. Go to SYSTEM INFO, DIAGNOSTICS, AUDIO, GENERATE TONE to listen to a codec-generated 1 kHz tone.
7. Go to SYSTEM INFO, ADMIN SETUP, PHONE AUDIO, and **un-check** the ECHO CANCELLER option.

WIRING FROM VIEWSTATION EX TO VORTEX DEVICE

The inputs and outputs to most codecs are unbalanced. We recommend keeping the cable from the Vortex device as short as possible to avoid any common-mode signals that may corrupt the audio.

INPUT TO VIEWSTATION EX FROM OUTPUT OF VORTEX DEVICE

Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

OUTPUT OF VIEWSTATION EX TO INPUT OF VORTEX DEVICE

Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

TIPS FOR VIEWSTATION EX

1. The volume control for the ViewStation EX controls the incoming far side audio and the local tone generator. It does not, however, control the sound effects inside the units such as incoming call ring and the female speech that occurs when you dial a number. This is important to note because if the volume control is very low, it may appear that the codec audio is operating correctly because the sound effects are still generated and will be heard in the local room. However, when a call is connected, the local side may not hear the far side because the local volume control is too low. Since the local participants heard the sound effects audio at a normal level, it may not be obvious that the volume control is set too low.

The sound effects volume control can be adjusted in the System Info, Admin Setup, Phone Audio page.

2. If the ViewStation EX is turned off either through the power switch or unplugged from the wall while the codec is still connected to the Vortex device via the input and output audio cables, a loopback will occur in the codec. This means that a portion of the audio signal that is sent to the codec from the Vortex device will be coupled into the signal that is sent from the codec to the Vortex device. This will cause the local room to hear a reinforced version of their own speech via the local room loudspeakers. Our recommendation is to leave the codec power on all the time; however, if the codec must be powered down, we recommend muting either the output channel of the Vortex device that will feed the input of the codec or the input channel of the Vortex device that is connected to the output of the codec.

Polycom ViewStation FX

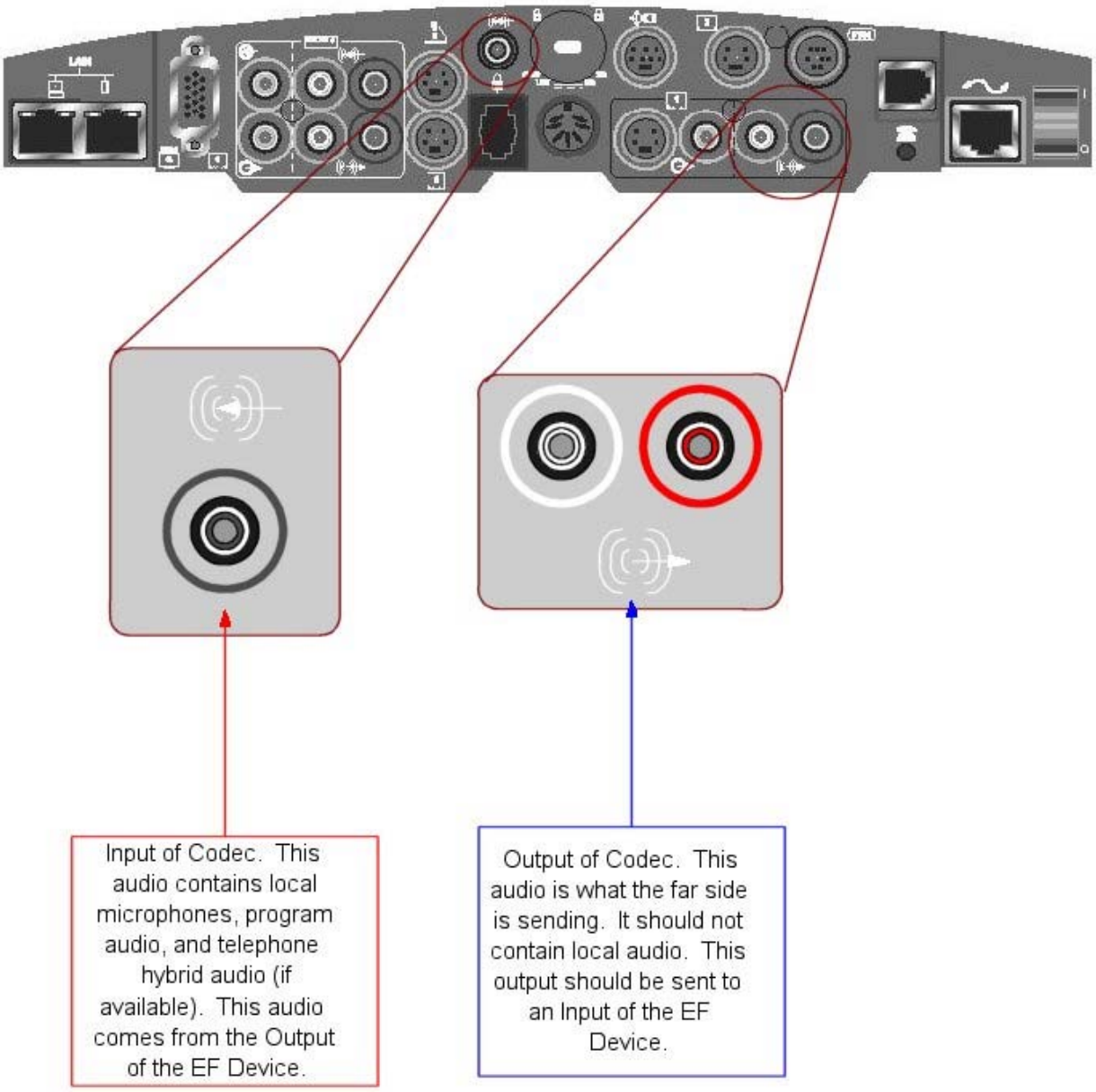
Connecting the ViewStation FX Inputs and Outputs

In order to send and receive audio to the Polycom ViewStation FX codec, you need to observe the following procedure:

1. Connect one of the Outputs of the Vortex device to the mixer input of the codec. By default, Outputs A-C of the Vortex device are mix-minus versions of the Inputs A-C signals.

2. Connect the auxiliary line level output of the codec to one of the line level inputs of the Vortex device (Inputs A-D). You may use one of the Mic/Line level inputs, but you need to disable all processing on that input (AEC, AGC, NC, Automixer), disable Phantom Power, and set the input to line level versus the default of mic level.

Follow the diagram below to make the proper physical connections to the codec. Do not use any other audio inputs or outputs as they could cause an audio loopback to occur within the codec.


Input of Codec. This audio contains local microphones, program audio, and telephone hybrid audio (if available). This audio comes from the Output of the EF Device.
Output of Codec. This audio is what the far side is sending. It should not contain local audio. This output should be sent to an Input of the EF Device.

You may connect either the left or the right channel of the auxiliary line level output to the Vortex device. Any audio that is sent from the far side will be monaural.

Please follow our instructions for wiring the Vortex device to the codec (See "Wiring from ViewStation FX to Vortex device"). Failure to do so may induce noise into the signals sent and received from the codec.

3. Raise the gain on the appropriate Input of the Vortex device to +10 dB.
4. Lower the gain on the appropriate Output of the Vortex device to -10 dB.

It is important to set the gain structure correctly so that you don't clip the input audio stage of the codec and that the Vortex device gets a good signal to perform processing with. The nominal input and output of the codec is .3 V rms. The nominal input and output of the Vortex device is .775 V rms. This equates to a difference of 8.24 dB between the two nominal levels. For simplicity, you may round that value to 10 dB.

SETTING THE AEC REFERENCE USING A VIEWSTATION FX

1. Connect a monitor to Output 1 of the codec. By default, the composite output is enabled and the S-Video output is disabled.
2. Go to SYSTEM INFO, ADMIN SETUP, PHONE AUDIO, and check the ECHO CANCELLER option. Ignore the warning that is displayed on the screen about disabling the echo canceller and select OK.
3. Once that is completed, make sure that the Input to the Vortex device is assigned to the appropriate AEC Reference signal. Consult Reference Manual for the Vortex device or the Help file in Conference Composer for more information.

TESTING THE AUDIO INPUTS AND OUTPUTS

1. Go to SYSTEM INFO, ADMIN SETUP, PHONE AUDIO, and check the ECHO CANCELLER option.

You must enable the codec's internal echo canceller in order for the audio meter described in Step 2 to work properly.

2. Go to SYSTEM INFO, DIAGNOSTICS, AUDIO, AUDIO METER and then speak into one of the microphones. Your level should be around 0 on the meter. You may also use the loop-back feature to listen to your own audio in the local room. That feature is under SYSTEM INFO, DIAGNOSTICS, NEAR END LOOP.
3. Go to SYSTEM INFO, DIAGNOSTICS, AUDIO, GENERATE TONE to listen to a codec-generated 1 kHz tone.

4. Go to SYSTEM INFO, ADMIN SETUP, PHONE AUDIO, and **un-check** the ECHO CANCELLER option.

WIRING FROM VIEWSTATION FX TO VORTEX DEVICE

The inputs and outputs to most codecs are unbalanced. We recommend keeping the cable from the Vortex device as short as possible to avoid any common-mode signals that may corrupt the audio.

INPUT TO VIEWSTATION FX FROM OUTPUT OF VORTEX DEVICE

Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

OUTPUT OF VIEWSTATION FX TO INPUT OF VORTEX DEVICE

Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

TIPS FOR VIEWSTATION FX

1. The volume control for the ViewStation FX controls the incoming far side audio and the local tone generator. It does not, however, control the sound effects inside the units such as incoming call ring and the female speech that occurs when you dial a number. This is important to note because if the volume control is very low, it may appear that the codec audio is operating correctly because the sound effects are still generated and will be heard in the local room. However, when a call is connected, the local side may not hear the far side because the local volume control is too low. Since the local participants heard the sound effects audio at a normal level, it may not be obvious that the volume control is set too low.

   The sound effects volume control can be adjusted in the System Info, Admin Setup, Phone Audio page.

2. If the ViewStation FX is turned off either through the power switch or unplugged from the wall while the codec is still connected to the Vortex device via the input and output audio cables, a loopback will occur in the codec. This means that a portion of the audio signal that is sent to the codec from the Vortex device will be coupled into the signal that is sent from the codec to the Vortex device. This will cause the local room to hear a reinforced version of their own speech via the local room loudspeakers. Our recommendation is to leave the codec power on all the time; however, if the codec must be powered down, we recommend muting either the output channel of the Vortex device that will feed the input of the codec or the input channel of the Vortex device that is connected to the output of the codec.

Polycom VS4000

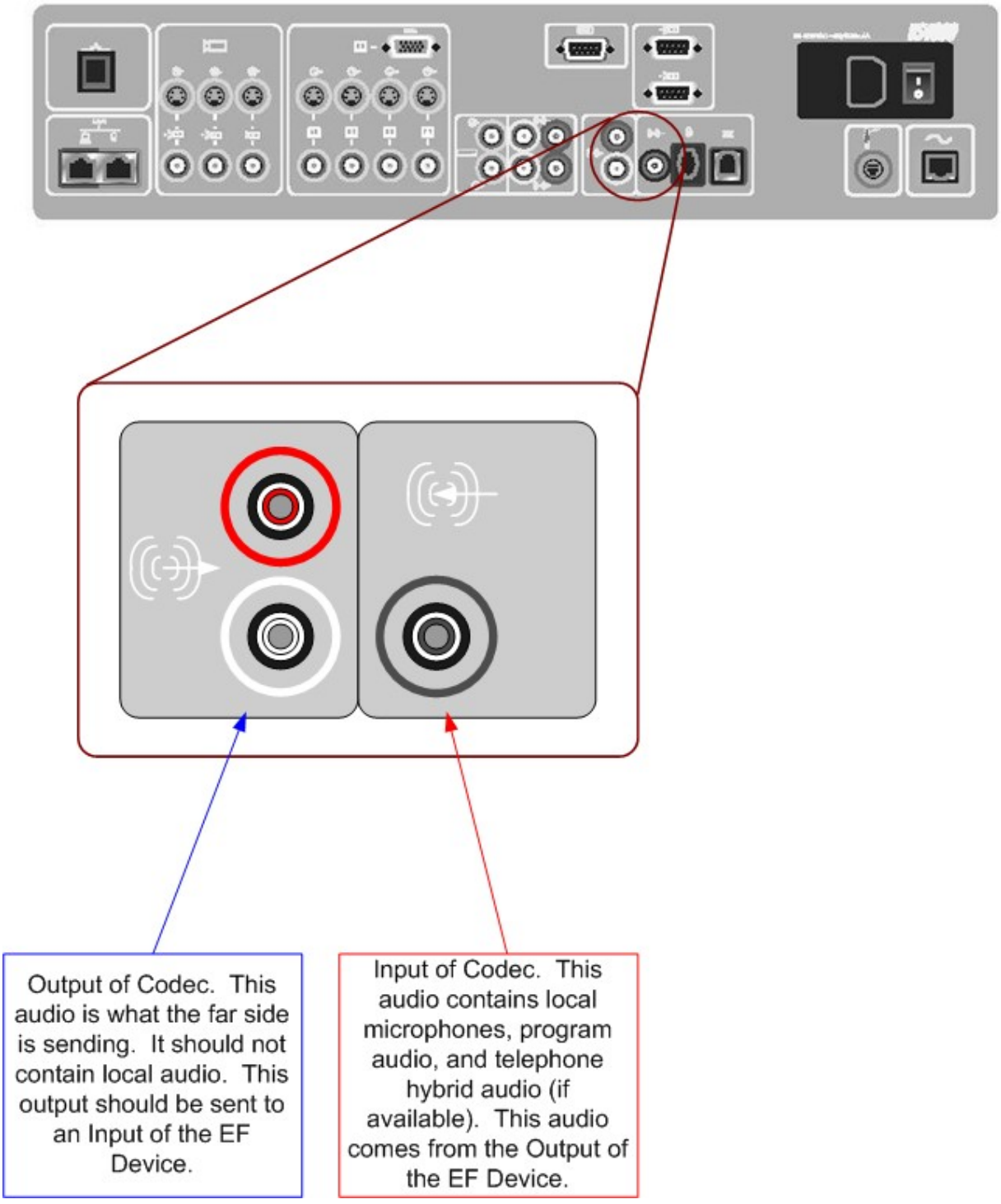
Connecting the VS4000 Inputs and Outputs

In order to send and receive audio to the Polycom VS4000 codec, you need to observe the following procedure:

1. Connect one of the Outputs of the Vortex device to the mixer input of the codec. By default, Outputs A-C of the Vortex device are mix-minus versions of the Inputs A-C signals.

2. Connect the auxiliary line level output of the codec to one of the line level inputs of the Vortex device (Inputs A-D). You may use one of the Mic/Line level inputs, but you need to disable all processing on that input (AEC, AGC, NC, Automixer), disable Phantom Power, and set the input to line level versus the default of mic level.

Follow the diagram below to make the proper physical connections to the codec. Do not use any other audio inputs or outputs as they could cause an audio loopback to occur within the codec.


Output of Codec. This audio is what the far side is sending. It should not contain local audio. This output should be sent to an Input of the EF Device.
Input of Codec. This audio contains local microphones, program audio, and telephone hybrid audio (if available). This audio comes from the Output of the EF Device.

You may connect either the left or the right channel of the auxiliary line level output to the Vortex device. Any audio that is sent from the far side will be monaural.

Please follow our instructions for wiring the Vortex device to the codec (See "Wiring from VS4000 to Vortex device"). Failure to do so may induce noise into the signals sent and received from the codec.

3. Raise the gain on the appropriate Input of the Vortex device to +10 dB.
4. Lower the gain on the appropriate Output of the Vortex device to -10 dB.

It is important to set the gain structure correctly so that you don't clip the input audio stage of the codec and that the Vortex device gets a good signal to perform processing with. The nominal input and output of the codec is .3 V rms. The nominal input and output of the Vortex device is .775 V rms. This equates to a difference of 8.24 dB between the two nominal levels. For simplicity, you may round that value to 10 dB.

SETTING THE AEC REFERENCE USING A VS4000

1. Connect a monitor to Output 1 of the codec. By default, the composite output is enabled and the S-Video output is disabled.
2. Go to SYSTEM INFO, ADMIN SETUP, PHONE AUDIO, and check the ECHO CANCELLER option. Ignore the warning that is displayed on the screen about disabling the echo canceller and select OK.
3. Once that is completed, make sure that the Input to the Vortex device is assigned to the appropriate AEC Reference signal. Consult the Reference Manual for the Vortex device or the Help file in Conference Composer for more information.

Testing the Audio Inputs and Outputs

1. Go to System Info, Admin Setup, Phone Audio, and check the Echo Canceller option.

   You must enable the codec's internal echo canceller in order for the audio meter described in Step 2 to work properly.

2. Go to System Info, Diagnostics, Audio, Audio Meter and then speak into one of the microphones. Your level should be around 0 on the meter. You may also use the loop-back feature to listen to your own audio in the local room. That feature is under System Info, Diagnostics, Near End Loop.
3. Go to System Info, Diagnostics, Audio, Generate Tone to listen to a codec-generated 1 kHz tone.
4. Go to System Info, Admin Setup, Phone Audio, and **un-check** the Echo Canceller option.

Wiring from VS4000 to Vortex device

The inputs and outputs to most codecs are unbalanced. We recommend keeping the cable from the Vortex device as short as possible to avoid any common-mode signals that may corrupt the audio.

Input to VS4000 from Output of Vortex Device

Connect the Positive conductor of the Vortex Device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

OUTPUT OF VS4000 TO INPUT OF VORTEX DEVICE

Connect the Positive conductor of the Vortex Device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

TIPS FOR VS4000

The volume control for the VS4000 controls the incoming far side audio and the local tone generator. It does not, however, control the sound effects inside the units such as incoming call ring and the female speech that occurs when you dial a number. This is important to note because if the volume control is very low, it may appear that the codec audio is fine because the sound effects are still generated and will be heard in the local room. However, when a call is connected, the local side may not hear the far side because the local volume control is too low. Since the local participants heard the sound effects audio at a normal level, it may not be obvious that the volume control is set too low.

The sound effects volume control can be adjusted in the System Info, Admin Setup, Phone Audio page.

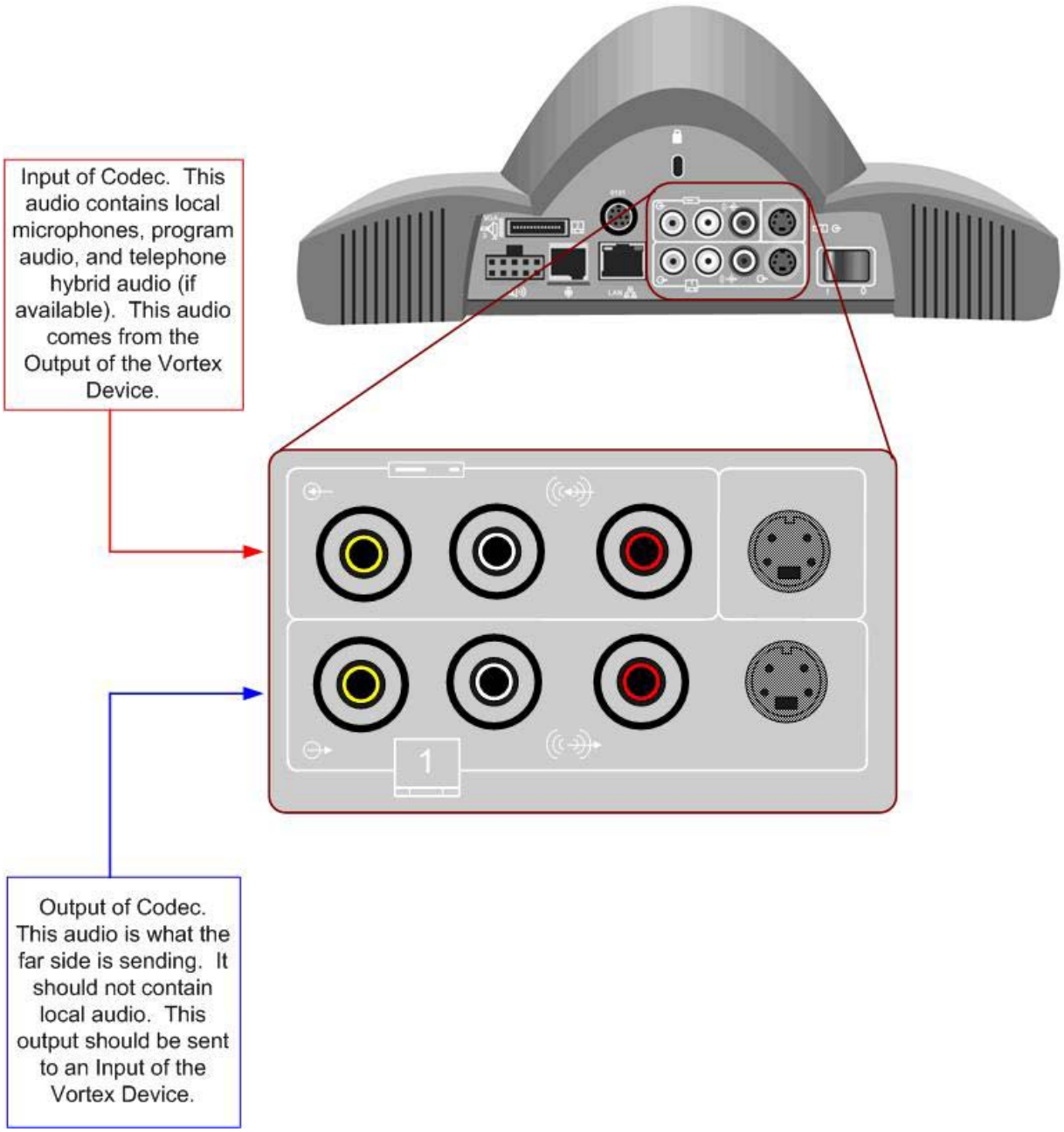
Polycom VSX™ 7000

CONNECTING THE VSX 7000 INPUTS AND OUTPUTS

In order to send and receive audio to the Polycom VSX 7000 codec, you need to observe the following procedure:

1. Connect one of the Outputs of the Vortex device to the mixer Input of the codec. By default, Outputs A-C of the Vortex device are mix-minus versions of the Inputs A-C signals.

2. Connect the auxiliary line level output of the codec to one of the line level inputs of the Vortex device (Inputs A-D). You may use one of the Mic/Line level inputs, but you need to disable all processing on that input (AEC, AGC, NC, Automixer), disable Phantom Power, and set the input to line level versus the default of mic level.


Input of Codec. This audio contains local microphones, program audio, and telephone hybrid audio (if available). This audio comes from the Output of the Vortex Device.
Output of Codec. This audio is what the far side is sending. It should not contain local audio. This output should be sent to an Input of the Vortex Device.
1

You may connect either the left or the right channel of the auxiliary line level output to the Vortex device. Any audio that is sent from the far side will be monaural.

Please follow our instructions for wiring the Vortex device to the codec. Failure to do so may induce noise into the signals sent and received from the codec.

3. Raise the gain on the appropriate Input of the Vortex device to +10 dB.
4. Lower the gain on the appropriate Output of the Vortex device to -10 dB.

It is important to set the gain structure correctly so that you don't clip the input audio stage of the codec and that the Vortex device gets a good signal to perform processing with. The nominal input and output of the codec is .3 V rms. The nominal input and output of the Vortex device is .775 V rms. This equates to a difference of 8.24 dB between the two nominal levels. For simplicity, you may round that value to 10 dB.

ENABLING THE VSX 7000 TO WORK WITH A VORTEX DEVICE

We recommend that the firmware version of the VSX 7000 be updated to at least 7.0 or higher because the internal VSX 7000 echo canceller can be disabled.

1. Connect a monitor to the video output of the codec.
2. Go to System, Admin Settings, Audio Settings, and select NEXT for Page 2. Select the AUDIO MIXER option for the Line Input that is connected to the Vortex device. Select OFF for the Echo Canceller option. Select Monitor-Far Site Audio for the Line Output. For both settings, leave the LEVEL settings at 5.
3. Disable the loudspeaker that is built-in to the VSX console. Go to System, Admin Settings, Audio Settings, and select NEXT, NEXT for Page 3. Select OFF for MIDRANGE SPEAKER. Depending on the type of loudspeakers you are using, you may want to lower and/or disable the Subwoofer. Make those changes in the SUBWOOFER SPEAKER and SUBWOOFER OFFSET sections.
4. Once that is completed, make sure that the Input to the Vortex device is assigned to the appropriate AEC Reference signal.

Testing the Audio Inputs and Outputs

1. Go to System, Diagnostics, Audio, Audio Meter and then speak into one of the microphones. Your level should be around 0 on the Line Input meter. You may also use the loop-back feature to listen to your own audio in the local room. That feature is under System, Diagnostics, Network, Near End Loop.
2. Go to System Info, Diagnostics, Audio, Generate Tone to listen to a codec-generated 400 Hz tone.

Wiring from VSX 7000 to Vortex Device

The inputs and outputs to most codecs are unbalanced. We recommend keeping the cable from the Vortex device as short as possible to avoid any common-mode signals that may corrupt the audio.

Input to VSX 7000 from Output of Vortex device

Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

Output of VSX 7000 to Input of Vortex device

Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

TIPS FOR VSX 7000

1. The volume control for the VSX 7000 controls the incoming far side audio and the local tone generator. It does not, however, control the sound effects inside the units such as incoming call ring and the female speech that occurs when you dial a number. This is important to note because if the volume control is very low, it may appear that the codec audio is operating correctly because the sound effects are still generated and will be heard in the local room. However, when a call is connected, the local side may not hear the far side because the local volume control is too low. Since the local participants heard the sound effects audio at a normal level, it may not be obvious that the volume control is set too low.

   The sound effects volume control can be adjusted in the System, Admin Settings, Audio Settings page.

2. If the VSX 7000 is turned off either through the power switch or unplugged from the wall while the codec is still connected to the Vortex device via the input and output audio cables, a loopback will occur in the codec. This means that a portion of the audio signal that is sent to the codec from the Vortex device will be coupled into the signal that is sent from the codec to the Vortex device. This will cause the local room to hear a reinforced version of their own speech via the local room loudspeakers. Our recommendation is to leave the codec power on all the time; however, if the codec must be powered down, we recommend muting either the output channel of the Vortex device that will feed the input of the codec or the input channel of the Vortex device that is connected to the output of the codec.

Polycom VSX 8000

Please refer to the Application Note entitled "Vortex - VSX 8000 Integration" for complete instructions on how to connect a Vortex device to a VSX 8000. Basic instructions follow:

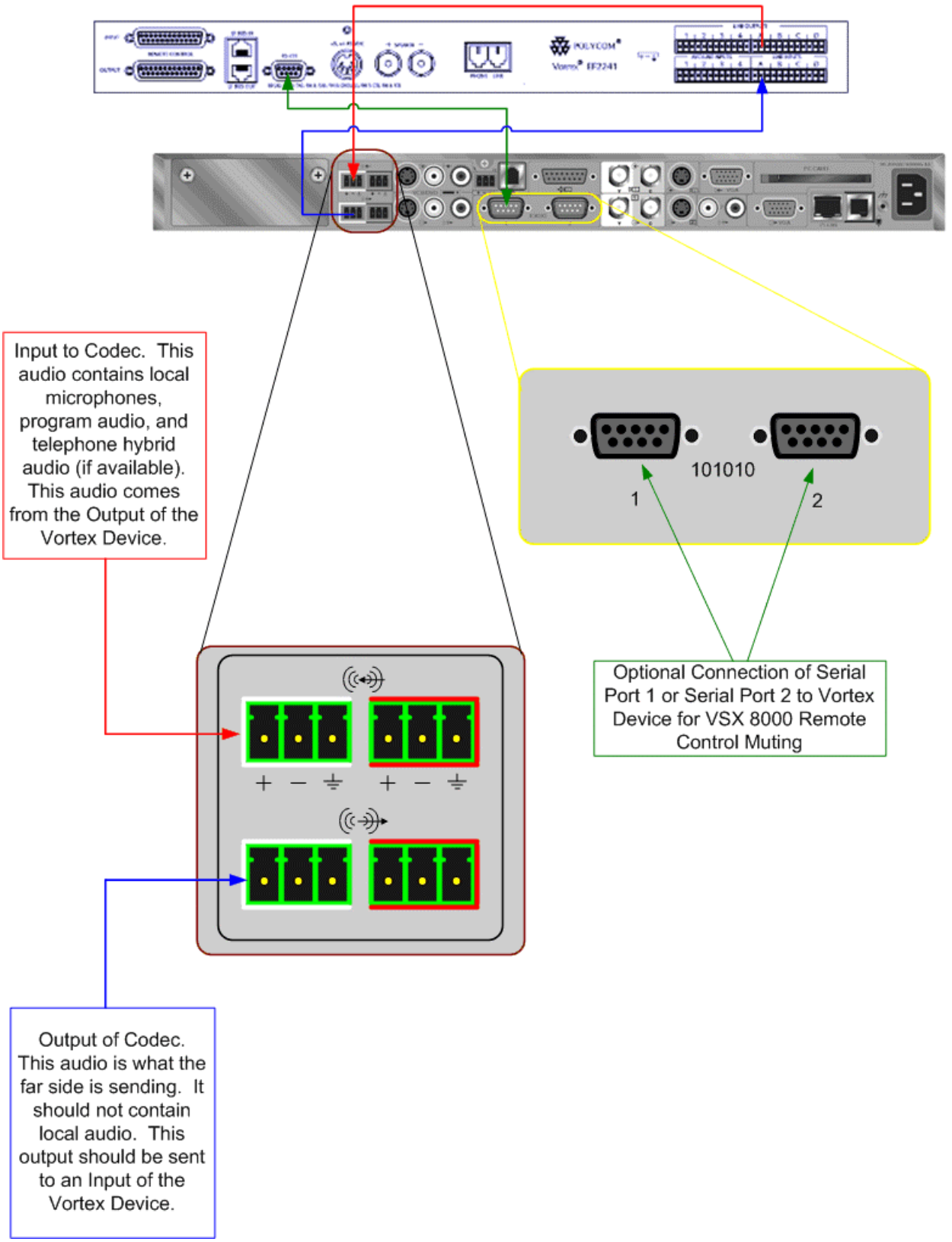
Connecting the VSX 8000 Inputs and Outputs

In order to send and receive audio to the Polycom VSX 8000 codec, you need to connect the system as shown in **Error! Reference source not found.** and described below.

1. Connect one of the Outputs of the Vortex device to the mixer Input of the codec. By default, Outputs A, B, or C of the Vortex device are mix-minus versions of the Inputs A, B, or C signals, respectively. Any of these signals can be used with the default factory preset on the Vortex. If you are using Polycom InstantDesigner™, choose the input and output that InstantDesigner recommends.

2. Connect the auxiliary line level output of the codec to one of the line level inputs of the Vortex device (Inputs A-D). If you have more line inputs, you may use one of the Mic/Line level inputs instead of a line level input, but you need to disable all processing on that Mic/Line input (AEC, AGC, NC, Automixer), disable Phantom Power, and set the input to line level versus the default of mic level.

3. Optionally connect the RS-232 interface between the VSX 8000 and the Vortex device.


Input to Codec. This audio contains local microphones, program audio, and telephone hybrid audio (if available). This audio comes from the Output of the Vortex Device.
101010
1
2
Optional Connection of Serial Port 1 or Serial Port 2 to Vortex Device for VSX 8000 Remote Control Muting
Output of Codec. This audio is what the far side is sending. It should not contain local audio. This output should be sent to an Input of the Vortex Device.

Connecting the VSX 8000 to a Vortex EF2241

You may use either the left or right channels for sending and receiving monaural audio to the VSX 8000. For stereo operation, both the left and right channels must be used.

Please follow our instructions for wiring the Vortex device to the codec (See the section WIRING FROM VSX 8000 TO VORTEX DEVICE). Failure to do so may induce him and ground noise into the signals sent and received from the codec.

ENABLING THE VSX 8000 TO WORK WITH A VORTEX DEVICE

1. Connect a video monitor to Video Output 1 of the codec.
2. On the VSX 8000 User Interface, go to SYSTEM, ADMIN SETTINGS, AUDIO SETTINGS, and select NEXT for Page 2. Select the LINE INPUT option for the Input Type. Set the Level setting to 5.
3. (Optional) Enable the VSX 8000 to control the Vortex Device by setting Serial Port 1 or Serial Port 2 to Vortex Mixer. In the VSX 8000 User Interface, go to SYSTEM, ADMIN SETTINGS, GENERAL SETTINGS, SERIAL PORTS. For the appropriate port, select VORTEX MIXER for RS-232 Mode. Verify that the baud rate of the VSX 8000 matches the baud rate of the Vortex Device. See the page CONTROLLING A VORTEX DEVICE VIA THE VSX8000 for more information.
4. Once that is completed, make sure that the Codec Input to the Vortex Device is assigned to the appropriate AEC Reference signal if the VSX 8000 will be used in Mono mode (Standard AEC Operation). If using InstantDesigner to create the configuration settings for the Vortex, the reference will be set automatically. For Stereo Mode, please refer to the STEREO AEC OPERATION section of the Vortex/VSX 8000 Integration Application Note.

GAIN STRUCTURE

MICROPHONE LEVELS

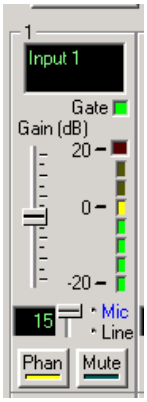
For wired microphones, the input gain on the Vortex is dependent on the sensitivity of the microphone as well as the typical distance from the talker to the microphone.

Table 1. Recommended microphone settings.

Type of Microphone	Average Level
Tabletop	Mic Mode, 15 dB
Ceiling	Mic Mode, 25 dB
Podium	Mic Mode, 10 dB
Gooseneck	Mic Mode, 5 dB
Wireless	Depends on the receiver*

*Some wireless receivers transmit audio at line level (approximately 0 to -10 dB) and others transmit at mic level (approximately -30 dB). Based on the transmit level, you may need to apply gain in the Vortex Device. For example, if a wireless receiver's nominal transmit level is -10 dB, you will need to apply +10 dB on the input of the Vortex Device to achieve unity (0 dB) gain.

In order to set the gain appropriately, we recommend leaving all processing enabled and having someone talk into the microphone. Have another person watch the levels in Conference Composer or via the front panel of the Vortex device. You want the speech to light up the first yellow LED (0 dBu) and flicker the second yellow LED (+3 dB) during normal conversation. This level indicates that the Vortex device has a good level for processing while having about 20 dB of headroom.



Gain Structure for Line Input Sources

Once the external devices have been wired to the Vortex Device, the Input and/or Output gain of the Vortex Device needs to be set to match the nominal level of the external devices. Here is a table that references the types of connectors to the proper input / output level of a Vortex Device:

Table 2. Recommended input and output gain settings based on connection type

Connector Type	Input Gain	Output Gain
RCA	+10 dB	-10 dB
1/8 inch	+10 dB	-10 dB
XLR	0 dB	0 dB
Phoenix / Terminal Block	0 dB	0 dB

The issue of nominal levels will affect the gain structure of the Vortex Device. Devices that have RCA and 1/8 inch style connectors are normally designed to operate with a nominal level of .3 Vrms. The Vortex Device is designed to operate with a nominal input and output level of .775 Vrms. This equates to a difference of 8.24 dB between the two nominal levels. For simplicity, you may round that value to 10 dB. Therefore, the inputs of the Vortex that receive consumer level outputs need to be set to +10 dB in order to achieve a unity gain. The outputs of the Vortex will be about 10 dB too high for the consumer level equipment and, in turn, need to be set to -10 dB to avoid clipping and to maintain enough headroom in the consumer level devices.

The Input gain of a Vortex device that is connected to a SoundStation VTX 1000 should be set to +10 dB. The Output gain of a Vortex device that is connected to a SoundStation VTX 1000 should be set to -10 dB. The Input and Output gains of a Vortex Device that is connected to a VSX 8000 and any other balanced devices should be set to 0 dB.

Testing the Audio Inputs and Outputs

1. Go to System, Diagnostics, Audio, Audio Meter and then speak into one of the microphones. Your level should be around 0 dB on the Balanced In meter. You may also use the loop-back feature to listen to your own audio in the local room. That feature is under System, Diagnostics, Network, Near End Loop.
2. Go to System Info, Diagnostics, Audio, Speaker Test to listen to a codec-generated 400 Hz tone.

Controlling a Vortex Device via the VSX 8000

When connected via an RS-232 cable to the VSX 8000, a Vortex Device can be controlled via the Mute button of the Remote Control of the VSX 8000. When the Mute button is pushed to mute the VSX8000, the VSX 8000 will send ***MACROX180 to Serial Port 1 or Serial Port 2. When the Mute button is pushed again to unmute the VSX 8000, the VSX 8000 will send a ***MACROX181 to Serial Port 1 or Serial Port 2.

Also, the Volume Up / Down buttons on the remote control also can control a Vortex Device. The Volume Up button will send a ***MACROX183 command to Serial Port 1 or 2 and the Volume Down button will send a ***MACROX184 command to Serial Port 1 or 2.

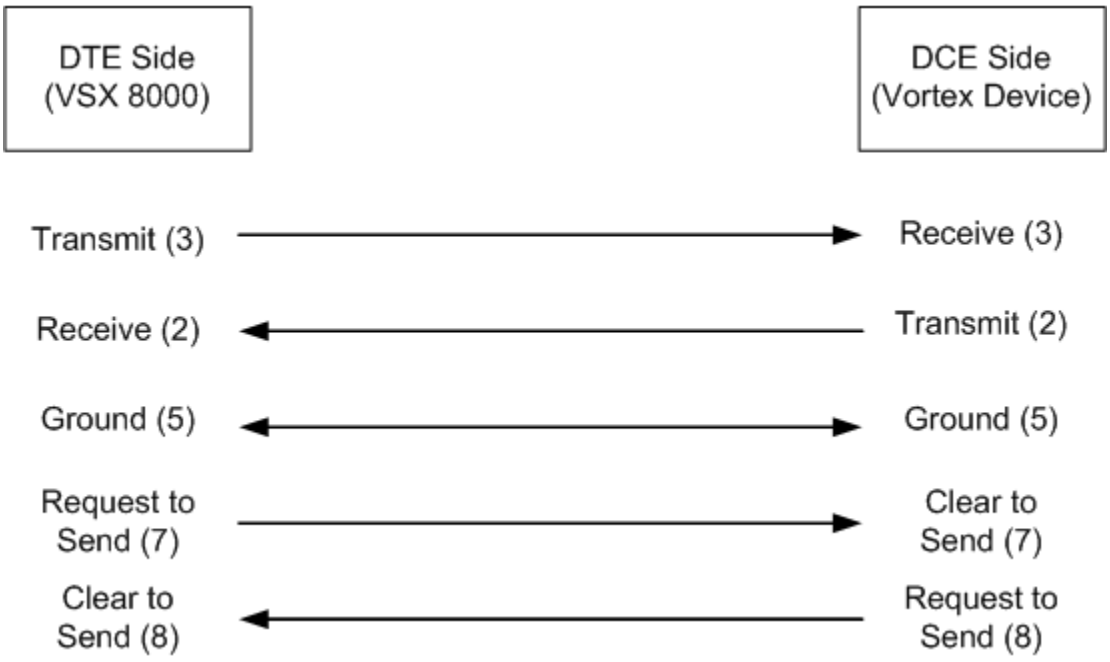
Here are three steps to follow in order to set up this functionality:

1.) Enable Vortex Mixer as an RS-232 Option in the VSX 8000

In the VSX 8000 User Interface, go to System, Admin Settings, General Settings, Serial Ports. For the appropriate port, select Vortex Mixer for RS-232 Mode.

Each Serial Port of the VSX8000 is wired as DTE. This means that the VSX 8000 transmits on Pin 2 and receives on Pin 3. In order to connect the VSX 8000's serial port to the Vortex Device's serial port, a "straight through" serial cable should be used.

Below is a diagram that shows how to make this connection:



Match the baud rate and flow control requirements of the VSX 8000 device to the baud rate and flow control settings of the Vortex Device. (When communicating with a Vortex device at baud rates higher than 9600, we recommend the use of flow control between the RS-232 device and the Vortex Device). Go to Vortex System Settings on the LCD display, select the Enter key, and use the Up or Down buttons to scroll until you see Baud Rate. Once that parameter is set, use the Up or Down buttons to scroll until you see Flow Control.

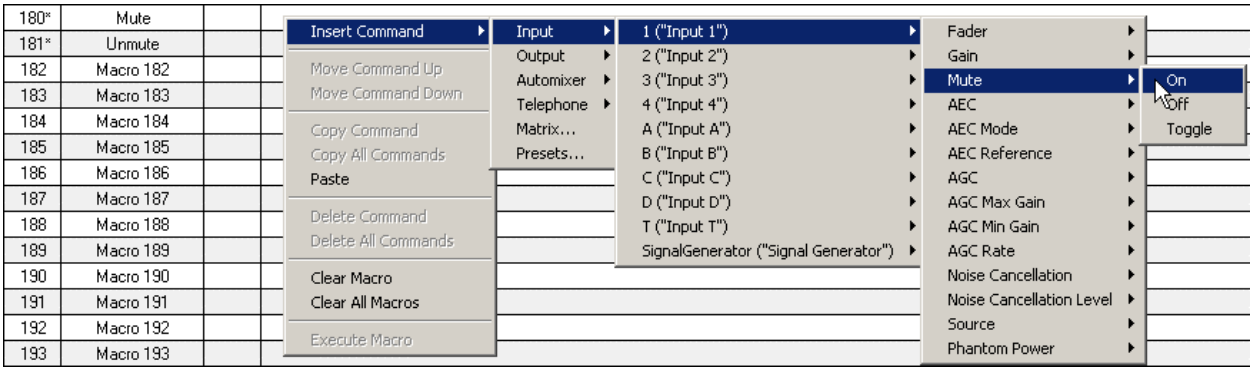
2.) Create the Appropriate Macros in the Vortex Device(s) Muting

As previously mentioned, the Mute button on the Remote Control sends a command to execute Macro 180 and Macro 181. Here is an example of how to write Muting Macros for a system with 4 microphones and an EF2241:

First, label Macro 180 as "Mute" and Macro 181 as "Unmute":

180*	Mute		
181*	Unmute		

Next, insert the muting command for Input 1. Click Insert Command, Input, 1, Mute, On:



If you are successful, you should see this in the window:

180*	Mute	1	Input 1 ("Input 1") Mute = On
181*	Unmute		

Repeat this process for Inputs 2-4. When you are done, you should see this:

180*	Mute	1	Input 1 ("Input 1") Mute = On
		2	Input 2 ("Input 2") Mute = On
		3	Input 3 ("Input 3") Mute = On
		4	Input 4 ("Input 4") Mute = On
181*	Unmute		

For Macro 181, repeat the same steps as for Macro 180 except that the Mute for Inputs 1-4 should be off. When you are finished, you should see this:

180*	Mute	1	Input 1 ("Input 1") Mute = On
		2	Input 2 ("Input 2") Mute = On
		3	Input 3 ("Input 3") Mute = On
		4	Input 4 ("Input 4") Mute = On
181*	Unmute	1	Input 1 ("Input 1") Mute = Off
		2	Input 2 ("Input 2") Mute = Off
		3	Input 3 ("Input 3") Mute = Off
		4	Input 4 ("Input 4") Mute = Off

If there are more inputs on other Vortex Devices in your system that need to be muted and unmuted, repeat these steps for the appropriate inputs.

VOLUME CONTROL (CODEC ONLY)

To use the Vortex Device to perform volume control, first set the VSX 8000's Balanced Outputs to FIXED. On

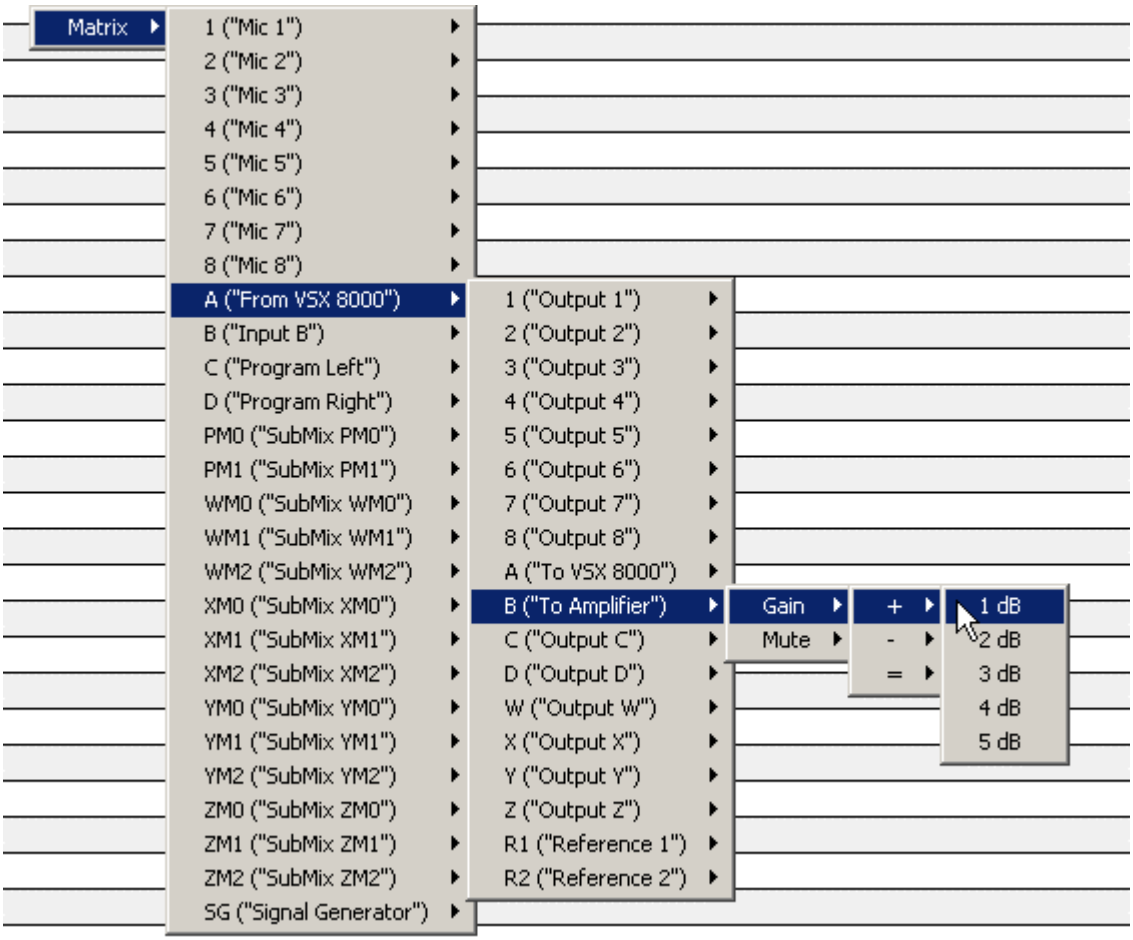
the VSX 8000 User Interface, go to SYSTEM, ADMIN SETTINGS, AUDIO SETTINGS, and select NEXT twice for Page 3. Select the FIXED option for Output Mode. Set the Level setting to 5.

As previously mentioned, the Volume Up / Down buttons on the Remote Control send a command to execute Macro 183 and Macro 184. Here is an example of how to write a Volume Control Macro for a system that has the VSX 8000 connected to Input A of a Vortex Device. Inside the Vortex Device, Input A is routed to Output B and to R1. The Macros should control the cross-point gains to Output B and to the R1 reference bus so that the room gain stays consistent for increasing volume.

First, label Macro 183 as "Volume Up" and Macro 184 as "Volume Down":

183*	Volume Up		
184*	Volume Down		

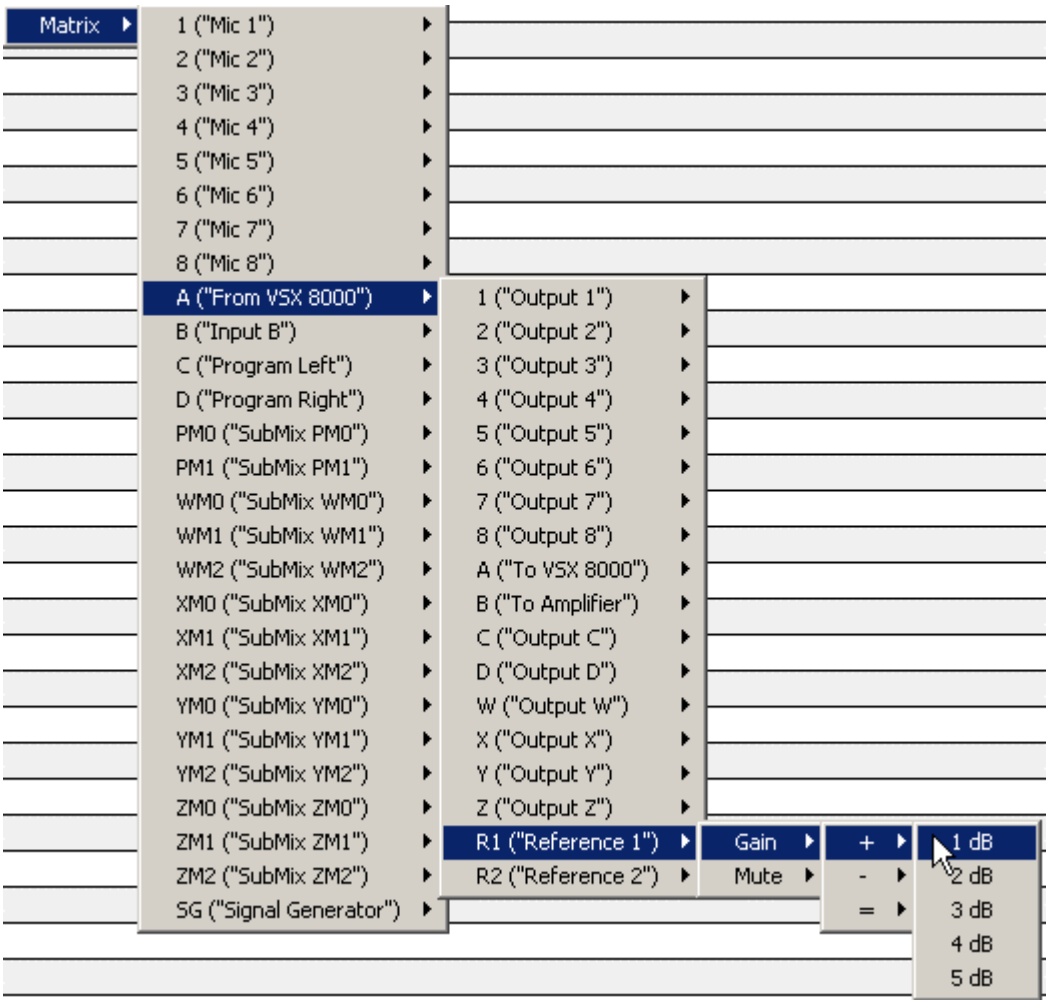
Next, insert the cross-point muting command for Input 1. Click Insert Command, Matrix, A ("From VSX 8000"), B ("To Amplifier"), Gain, +, 1 dB:



If you are successful, you should see this in the window:

183*	Volume Up	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = + 1 dB
184*	Volume Down		

Next, add the cross-point control for R1. Click Insert Command, Matrix, A ("From VSX 8000"), R1 ("Reference 1"), Gain, +, 1 dB:



If you are successful, you should see this in the window:

183*	Volume Up	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = + 1 dB
		2	Matrix(Input A ("From VSX 8000"),Output R1 ("Reference 1")) Gain = + 1 dB
184*	Volume Down		

For Macro 184, repeat the same steps as for Macro 183 except that the increments for each cross-point should be -1 dB. When you are finished, you should see this:

183*	Volume Up	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = + 1 dB
		2	Matrix(Input A ("From VSX 8000"),Output R1 ("Reference 1")) Gain = + 1 dB
184*	Volume Down	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = - 1 dB
		2	Matrix(Input A ("From VSX 8000"),Output R1 ("Reference 1")) Gain = - 1 dB

VOLUME CONTROL (CODEC AND TELEPHONE)

If the Vortex Device to be controlled has a built in telephone hybrid (such as the Vortex EF2241) or if the Vortex Device is linked via the EFBus to another Vortex Device that does have a built in telephone hybrid, the Volume Up / Down buttons of the VSX 8000 remote control can also control that volume.

Here is an example of how to write a Volume Control Macro for a system that has the VSX 8000 connected to Input A of a Vortex Device and a built-in telephone hybrid on Input T. Inside the Vortex Device, Input A and Input T are routed to Output B and to the reference R1. The Macros should control the cross-point gains for Inputs A and T to Output B and to the R1 reference bus so that the room gain stays as the volume is increased.

First, follow the directions given in the VOLUME CONTROL (CODEC ONLY) section to setup Macros 183 and 184. Next, assign the Input T to Output B cross-point at +1 dB and the Input T to Output R1 cross-point at +1 dB to Macro 183. If you are successful, you should see the following:

183*	Volume Up	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = + 1 dB
		2	Matrix(Input A ("From VSX 8000"),Output R1 ("Reference 1")) Gain = + 1 dB
		3	Matrix(Input T ("From Phone"),Output B ("To Amplifier")) Gain = + 1 dB
		4	Matrix(Input T ("From Phone"),Output R1 ("Reference 1")) Gain = + 1 dB

Finally, assign the Input T to Output B cross-point at -1 dB and the Input T to Output R1 cross-point at -1 dB to Macro 183. If you are successful, you should see the following:

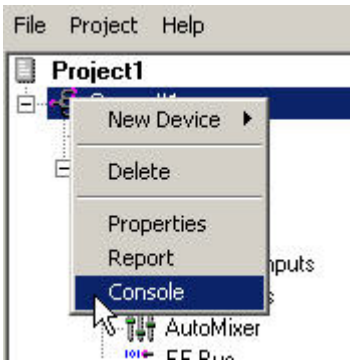
183*	Volume Up	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = + 1 dB
		2	Matrix(Input A ("From VSX 8000"),Output R1 ("Reference 1")) Gain = + 1 dB
		3	Matrix(Input T ("From Phone"),Output B ("To Amplifier")) Gain = + 1 dB
		4	Matrix(Input T ("From Phone"),Output R1 ("Reference 1")) Gain = + 1 dB
184*	Macro 184	1	Matrix(Input A ("From VSX 8000"),Output B ("To Amplifier")) Gain = - 1 dB
		2	Matrix(Input A ("From VSX 8000"),Output R1 ("Reference 1")) Gain = - 1 dB
		3	Matrix(Input T ("From Phone"),Output B ("To Amplifier")) Gain = - 1 dB
		4	Matrix(Input T ("From Phone"),Output R1 ("Reference 1")) Gain = - 1 dB

3.) Verify that the VSX 8000 Remote Control properly controls the Vortex Device

If there is only one Vortex Device, go to System, Diagnostics, Audio, Audio Meter in the VSX 8000 User Interface and first verify that there is activity on the Balanced In meter by talking into one of the microphones. Next, press the Mute button on the Remote Control. Now, there should be no activity on the Balanced In meter. Press the Mute button again and you should see meter activity on the Balanced In meter.

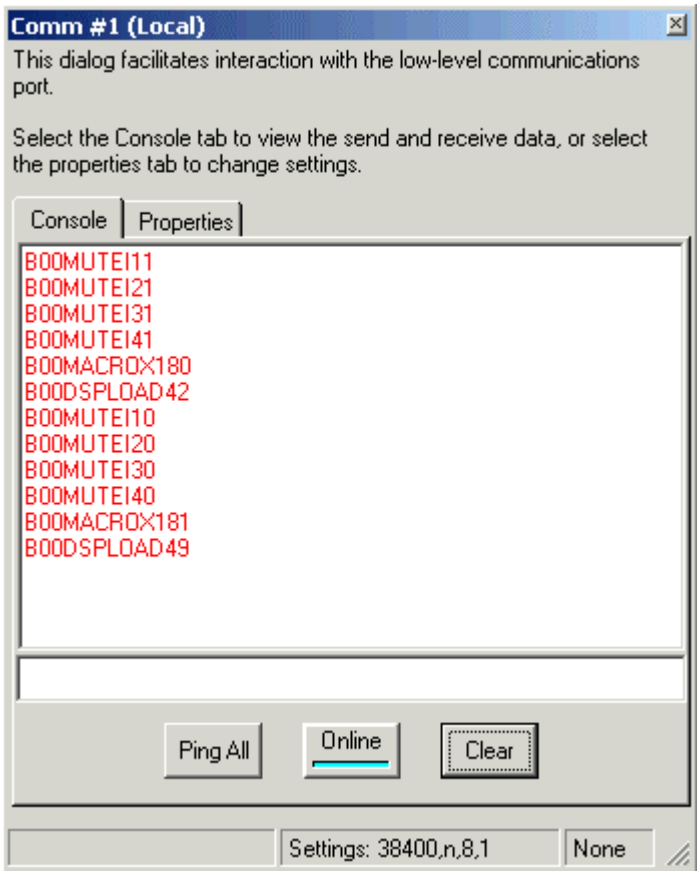
To test the Volume Up / Down buttons, turn on the signal generator in the VSX 8000 User Interface. Go to System Info, Diagnostics, Audio, Speaker Test.

If there are multiple linked Vortex Devices in the system you can perform the same series of steps, or you can connect your computer to the RS-232 port of the second Vortex device, run Conference Composer, autoscan, and open a Console Window in Conference Composer by right clicking on the Comm port in the left side of the window and select Console as shown in **Error! Reference source not found.**.



Open the console window by right clicking on the device chain and selecting Console.

Now, push the Mute button on the VSX 8000's Remote Control. If the Macro programming was successful, you should see activity in the Console Window:



Repeat the process for the Volume Up and Volume Down buttons if you have assigned commands to Macro's 183 and 184.

For more information on setting up the VSX 8000 with a Vortex device, including stereo operation, gated mixer settings and more, please see the Application Note "Vortex/VSX 8000 Integration."

Other Video Codecs

Connecting the Inputs and Outputs

In order to send and receive audio to the video codec, you need to observe the following procedure:

1. Connect one of the Outputs of the Vortex device to the Input of the codec. By default, Outputs A-C of the Vortex device are mix-minus versions of the Inputs A-C signals.
2. Connect the line level output of the codec to one of the line level inputs of the Vortex device (Inputs A-D). You may use one of the Mic/Line level inputs, but you need to disable all processing on that input (AEC, AGC, NC, Automixer), disable Phantom Power, and set the input to line level versus the default of mic level.

On some codecs, you must use a specific combination of Inputs or Outputs so that the incoming audio signal is not echo cancelled and/or not sent to a specific output. Please follow our instructions for using the appropriate combination of Inputs and Outputs.

Please follow our instructions for wiring the Vortex device to the codec. Failure to do so may induce noise into the signals sent and received from the codec.

3. Raise the gain on the appropriate Input of the Vortex device to +10 dB.
4. Lower the gain on the appropriate Output of the Vortex device to -10 dB.
5. Go to Audio Settings, Input, Level Settings and set the gain on the proper Input to 0 dB.
6. Go to Audio Settings, Output, Level Settings and set the gain on the proper Input to 0 dB.

It is important to set the gain structure correctly so that you don't clip the input audio stage of the codec and that the Vortex device gets a good signal to perform processing with. The nominal input and output of the codec is .3 V rms (at 0 dB of gain on both inputs and outputs). The nominal input and output of the Vortex device is .775 V rms. This equates to a difference of 8.24 dB between the two nominal levels. For simplicity, you may round that value to 10 dB.

Setting the AEC Reference

Some video codecs require the use a specific combination of Input and Output connections to avoid creating an audio loop-back inside the codec. For these codecs, we recommend the following:

- Use Input 5 and Output 2. Input 5 is not echo cancelled by the video codec and Output 2 is a mix of all inputs to the codec except for Input 5. If Input 5 or Output 2 is not available, use Input 6 and Output 3. Input 6 is also is not echo cancelled by the video codec and Output 3 is a mix of all inputs to the codec except for Input 6.
- Make sure that the Input/Output combination you decide to use is enabled. Go to AUDIO SETTINGS, INPUTS and make sure that the ON box is enabled for that Input. Perform the same task for AUDIO SETTINGS, OUTPUT.
- Disable the AGC on Input 5 or Input 6 (depending on which Input is connected to the Vortex device).

Once that is completed, make sure that the Input to the Vortex device is assigned to the appropriate AEC Reference signal. Consult the Reference Manual for the Vortex device or the Help file in Conference Composer for more information.

WIRING FROM CODEC TO VORTEX DEVICE

The inputs and outputs to most codecs are unbalanced. We recommend keeping the cable from the Vortex device as short as possible to avoid any common-mode signals that may corrupt the audio.

INPUT TO CODEC FROM OUTPUT OF VORTEX DEVICE

Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

OUTPUT OF CODEC TO INPUT OF VORTEX DEVICE

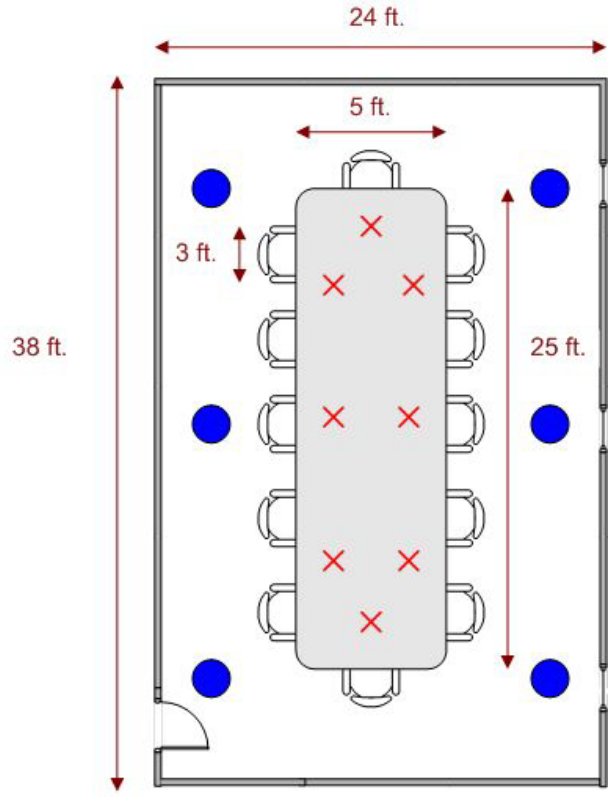
Connect the Positive conductor of the Vortex device to the Tip of the RCA connector and the Negative conductor of the Vortex device to Shield of the RCA connector.

The shield of the cable is not connected.

System Example

Introduction / Room Layout

This example illustrates a 24 ft. X 38 ft. X 10 ft. conference room that has 8 tabletop microphones and 6 ceiling loudspeakers. The system includes a EF2280 matrix mixer, an EF2201 telephone hybrid, a video codec, and a program audio source. There is no sound reinforcement in this room.



Key:

Table Microphone:

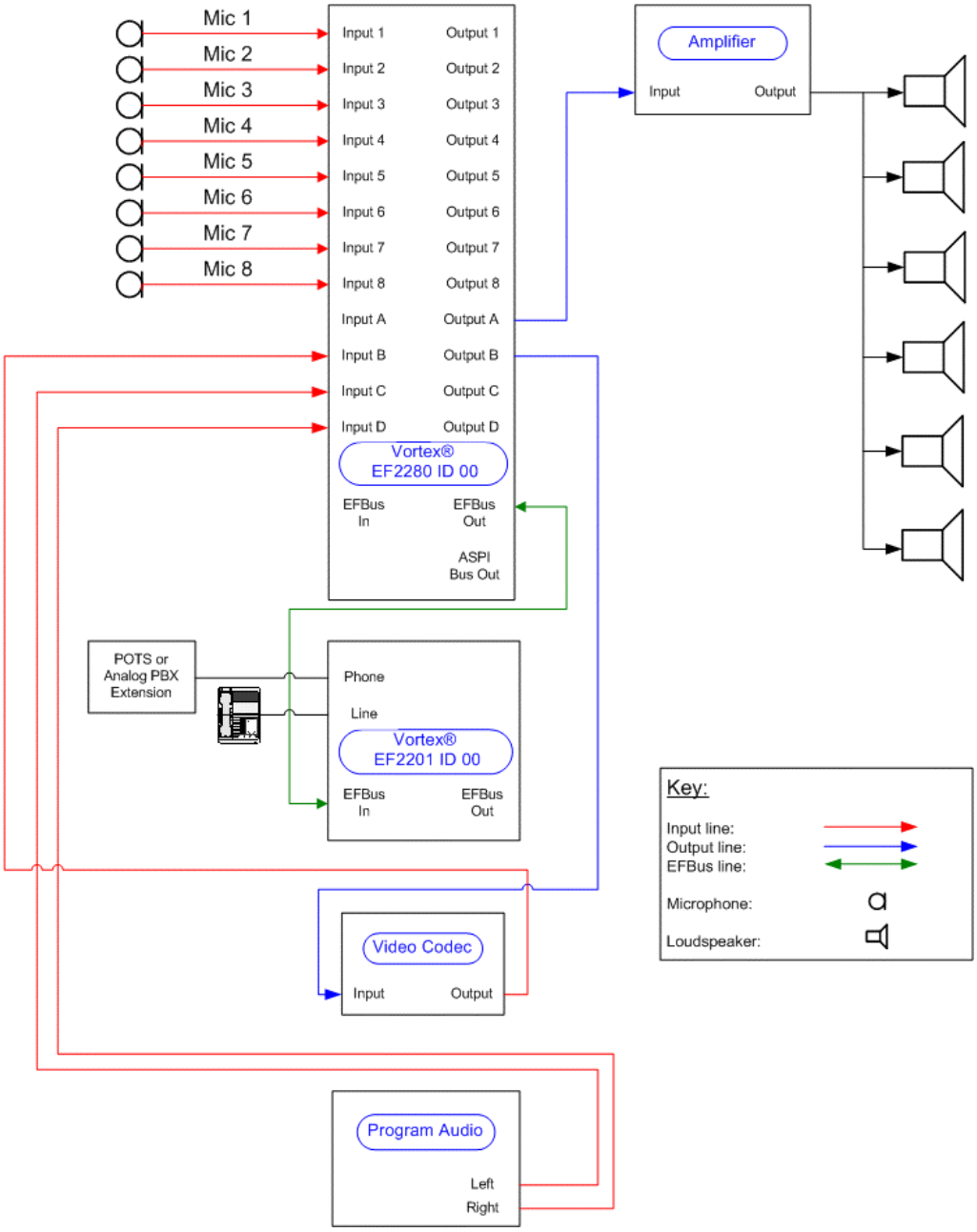
Ceiling Loudspeaker:

General Notes:

Ceiling height is 10 feet. Ceiling loudspeaker sensitivity is assumed to be at least 85 dB 1W/1M and the coverage angle is assumed to be at least 120 degrees. Microphones are assumed to have a cardioid pickup pattern

SYSTEM LAYOUT

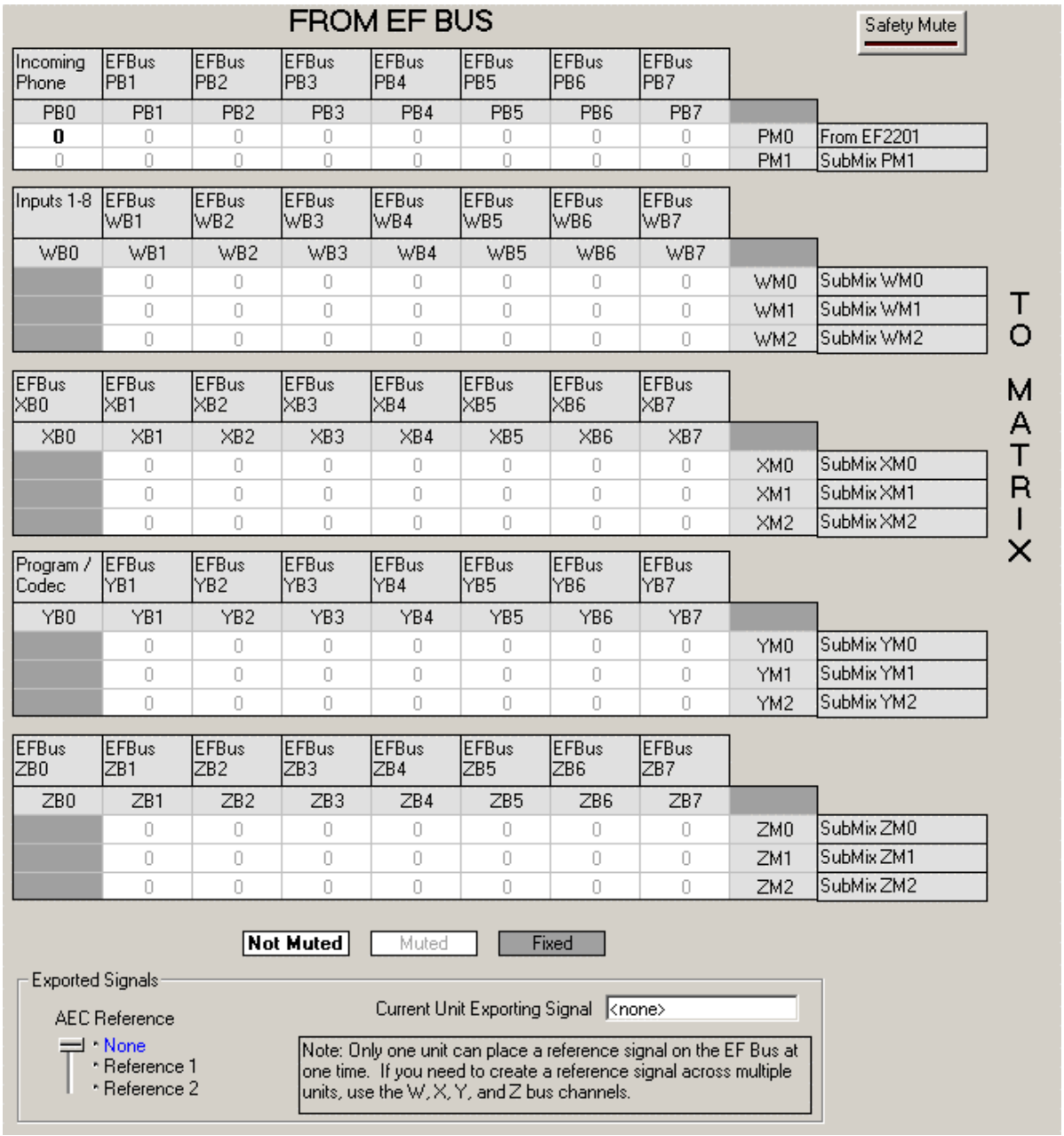
The audio components for the room are 8 tabletop microphones, 1 EF2280, 1 EF2201, 1 video codec, 1 amplifier, 1 program audio source, and 6 ceiling loudspeakers. Each of the microphones will use Inputs 1-8. The video codec will use Input B / Output B. The program source will use Inputs B and C. The amplifier will use Output A.



CONFERENCE COMPOSER LAYOUT EF2280

Most of the default parameters of the EF2280 will satisfy our design such as microphone gains and automixer settings. However, we will need to re-label the EFBus for clarity and change the Matrix Mixer and Presets to satisfy our design goals.

EFBUS


FROM EF BUS
Safety Mute
Incoming Phone
EFBus PB1
EFBus PB2
EFBus PB3
EFBus PB4
EFBus PB5
EFBus PB6
EFBus PB7
PB0 PB1 PB2 PB3 PB4 PB5 PB6 PB7
0 0 0 0 0 0 0 0 PM0 From EF2201
0 0 0 0 0 0 0 0 PM1 SubMix PM1
Inputs 1-8
EFBus WB1
EFBus WB2
EFBus WB3
EFBus WB4
EFBus WB5
EFBus WB6
EFBus WB7
WB0 WB1 WB2 WB3 WB4 WB5 WB6 WB7
0 0 0 0 0 0 0 WM0 SubMix WM0
0 0 0 0 0 0 0 WM1 SubMix WM1
0 0 0 0 0 0 0 WM2 SubMix WM2
EFBus XB0
EFBus XB1
EFBus XB2
EFBus XB3
EFBus XB4
EFBus XB5
EFBus XB6
EFBus XB7
XB0 XB1 XB2 XB3 XB4 XB5 XB6 XB7
0 0 0 0 0 0 0 XM0 SubMix XM0
0 0 0 0 0 0 0 XM1 SubMix XM1
0 0 0 0 0 0 0 XM2 SubMix XM2
Program / Codec
EFBus YB1
EFBus YB2
EFBus YB3
EFBus YB4
EFBus YB5
EFBus YB6
EFBus YB7
YB0 YB1 YB2 YB3 YB4 YB5 YB6 YB7
0 0 0 0 0 0 0 YM0 SubMix YM0
0 0 0 0 0 0 0 YM1 SubMix YM1
0 0 0 0 0 0 0 YM2 SubMix YM2
EFBus ZB0
EFBus ZB1
EFBus ZB2
EFBus ZB3
EFBus ZB4
EFBus ZB5
EFBus ZB6
EFBus ZB7
ZB0 ZB1 ZB2 ZB3 ZB4 ZB5 ZB6 ZB7
0 0 0 0 0 0 0 ZM0 SubMix ZM0
0 0 0 0 0 0 0 ZM1 SubMix ZM1
0 0 0 0 0 0 0 ZM2 SubMix ZM2
TO MATRIX
Not Muted
Muted
Fixed
Exported Signals
AEC Reference
None
Reference 1
Reference 2
Current Unit Exporting Signal
<none>
Note: Only one unit can place a reference signal on the EF Bus at one time. If you need to create a reference signal across multiple units, use the W, X, Y, and Z bus channels.

The default routing of the EFBus will be sufficient for our design. However, for clarity, the labels have been changed to reflect the signals that are placed onto the bus and all unneeded cross-points have been muted. Since the EF2201 uses the P Bus to send telephone audio to the EF2280 and the ID of the EF2201 is 00, the audio signal PB0 needs to be routed to Input PM0 of the EF2280. Remember that the signals that a unit places onto the EFBus is put into a placeholder where that placeholder is identified by the device ID of the unit that put the audio signal into this placeholder. Here, the EF2201 placed audio onto the P Bus and since the unit has a device ID of 00, the placeholder is identified as PB1 where the "B" stands for bus. The EF2280 takes that signal from the bus and internally assigns that signal to one of two mixes for the P Bus: PM0 or PM1, where the "M" stands for mix.

MATRIX MIXER

The matrix mixer will need to be changed from the default settings in order to use Output A for the amplifier. Only Inputs B, C, D, and PM0 need to be assigned to Output A. By default, Inputs 1-8 are routed to Output's B and W. Note that since Inputs 1-8 are microphones, the cross-points are colored blue to indicate that they are gated to Outputs B and W.

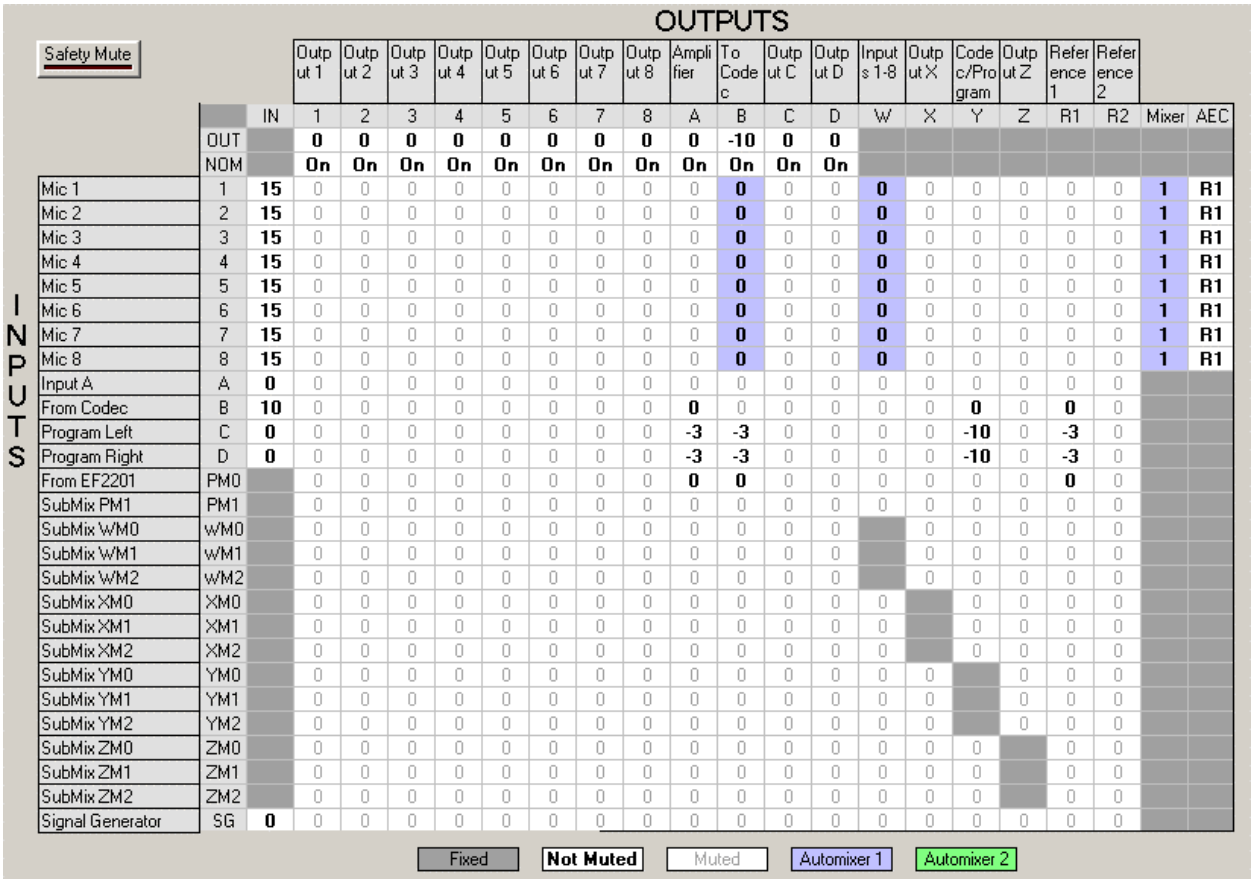
Inputs C and D are attenuated by 3 dB to Outputs A, B, and R1 because if the left and right channels are mono, both channels will increase 6 dB in gain (Mathematically, two signals of 1V peak-to-peak amplitude are added together, the result is a signal of 2V peak-to-peak. In terms of decibels, that can be expressed as 20*log (2V / 1V) which equals 6 dB). Inputs B and C are reduced by 10 dB to Output Y because if a program source is mixed at 0 dB with local speech, it may be difficult for the remote person on the telephone to distinguish between the program audio and the local speech because of the frequency limitations of the telephone network. By attenuating the program audio, you "bias" the audio sent to the telephone in favor of the local speech.

Input B and Output B are set to +10 dB and -10 dB respectively. The reason is that the nominal input and output of the codec is .3 V rms. The nominal input and output of the Vortex device is .775 V rms. This equates to a difference of 8.24 dB between the two nominal levels. For simplicity, you may round that value to 10 dB. It is important to set the gain structure correctly so that you don't clip the input audio stage of the codec and that the Vortex device gets a good signal to perform processing.

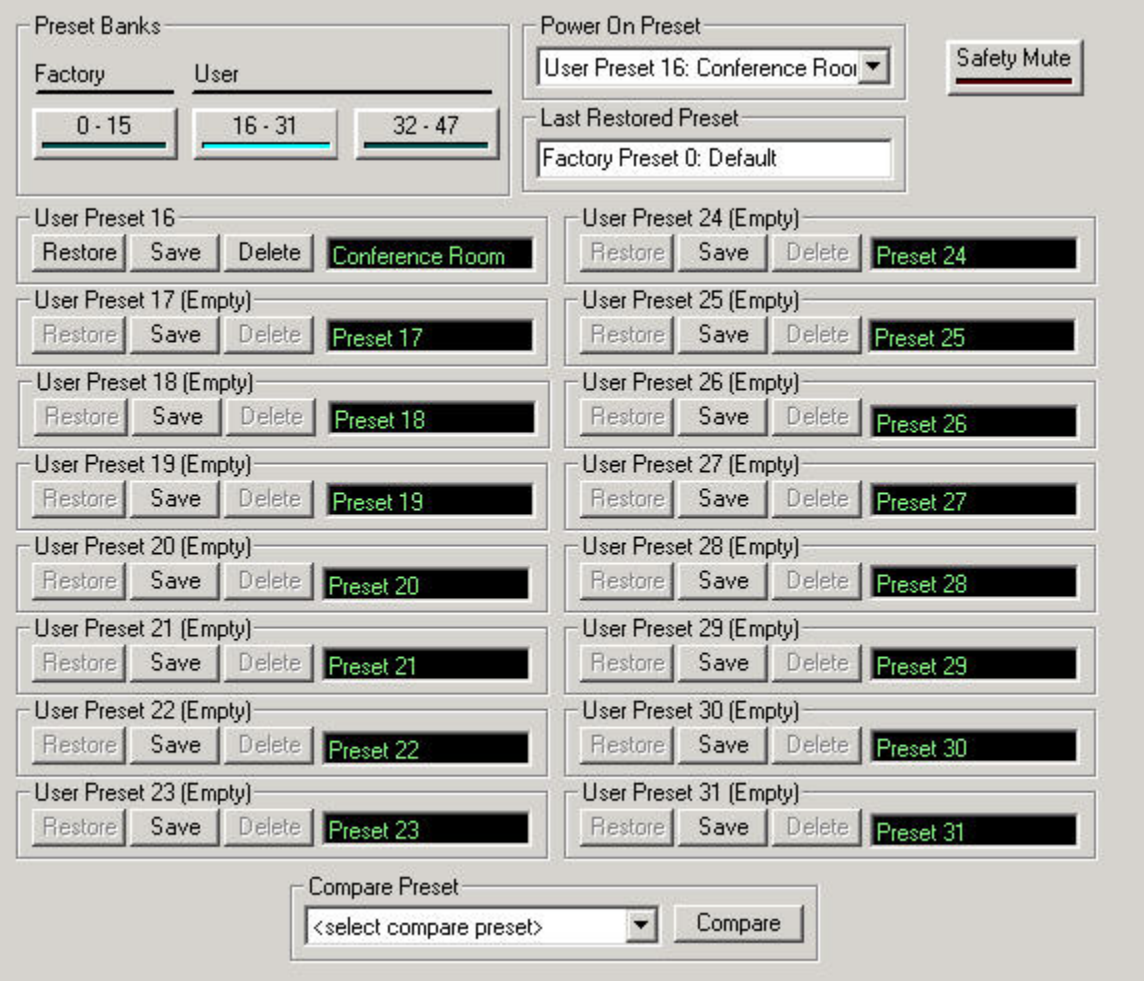
The outputs W and Y are signals that will be sent over the EFBus to the EF2201. See the section entitled Conference Composer Layout EF2201 to find out how to take those signals from the bus and send the to the telephone line.

The output R1 is our Acoustic Echo Canceller (AEC) reference signal. This signal is what the internal AEC uses to remove from the local microphones. In our example, we will remove the codec, telephone audio, and program audio from the local microphones.

Local Microphones should NEVER be included the reference signal!



PRESETS

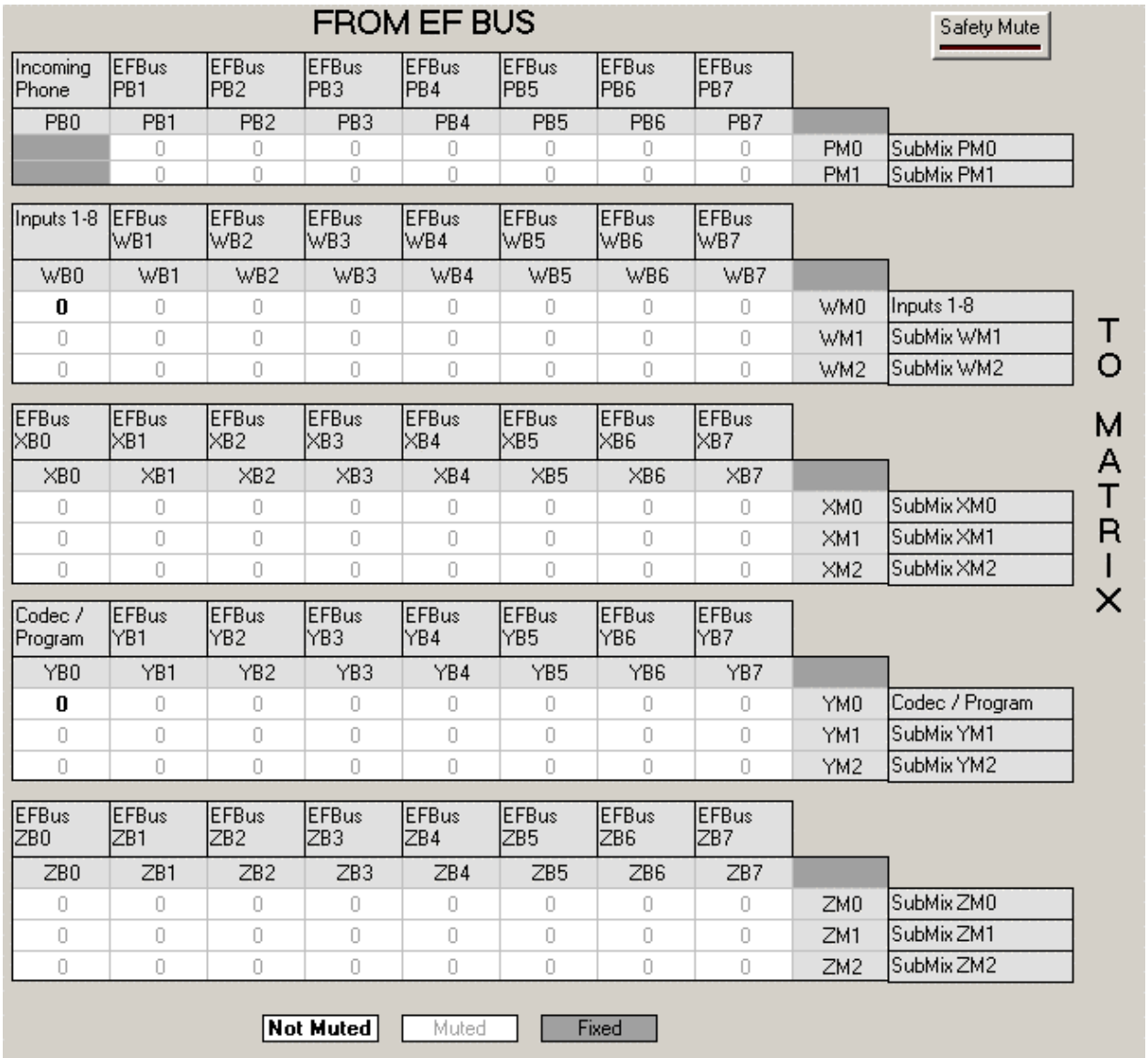


In order to permanently save the settings to the EF2280, you must use a User Preset. Here, we've used Preset 16, although you may use any of the User Presets 16-47 to accomplish this task. We've also renamed User Preset 16 to Conference Room. Once the User Preset has been saved, you must also change the Power on Preset to reflect the proper Preset that you want the unit to power up to if the unit loses AC power.

CONFERENCE COMPOSER LAYOUT EF2201

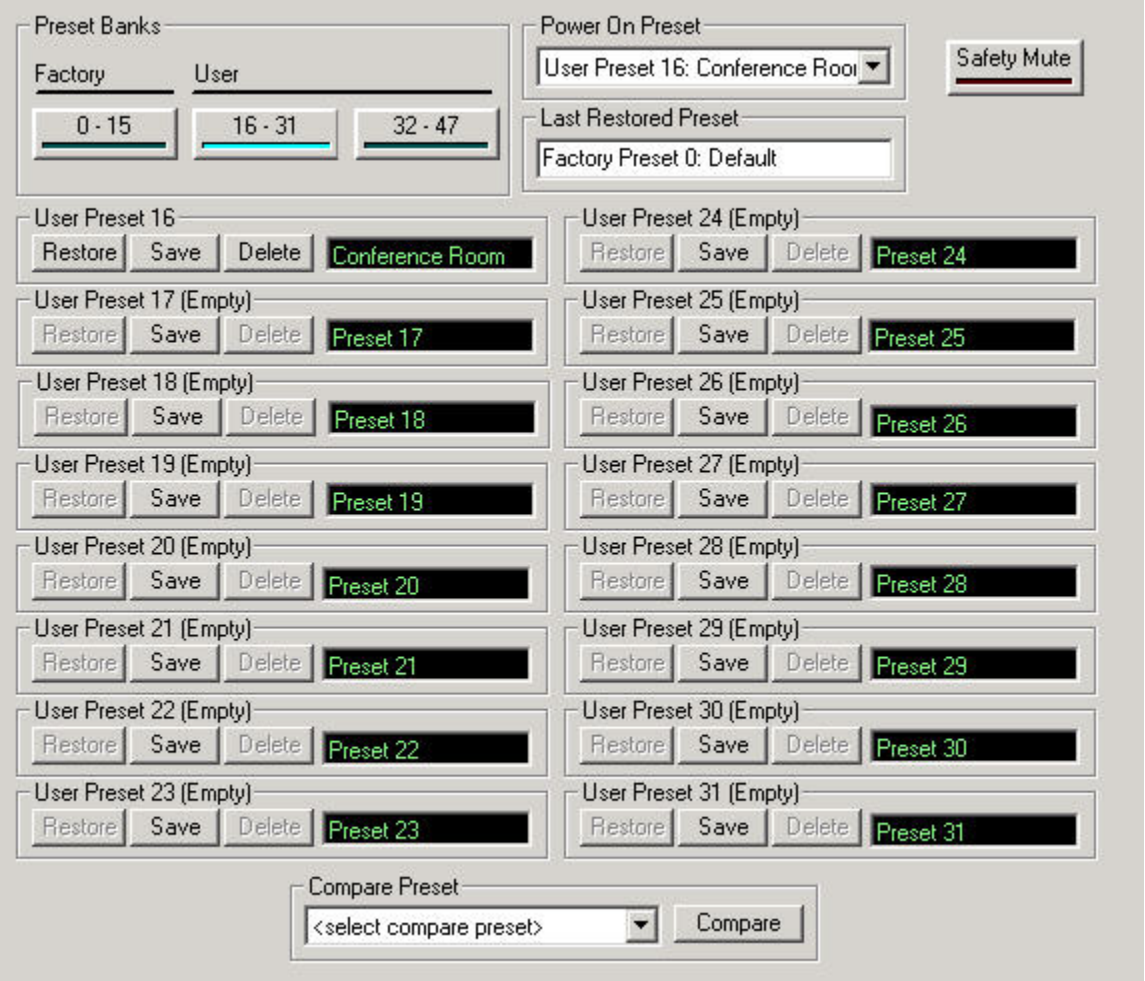
Most of the default parameters of the EF2201 will satisfy our design such as microphone gains and automixer settings. However, we will need to need to re-label the EFBus for clarity and change Presets to satisfy our design goals.

EFBUS



The default routing of the EFBus will be sufficient for our design. However, for clarity, the labels have been changed to reflect the signals that are placed onto the bus and all unneeded cross-points have been muted. Since the EF2280 uses the W and Y buses to send microphone, codec, and program audio to the EF2201 and the ID of the EF2280 is 00, the audio signals WB0 and YB0 need to be routed to Inputs WM0 and YM0 of the EF2280. Remember that the signals that a unit places onto the EFBus is put into a placeholder where that placeholder is identified by the Device ID of the unit that put the audio signal into this placeholder. Here, the EF2280 placed audio onto the W and Y buses and since the unit has a device ID of 00, the placeholder is identified as WB0 and YB0 where the "B" stands for bus. The EF2201 takes that signal from the bus and internally assigns that signal to one of three mixes for the W Bus (WM0, WM1, or WM2) and one of three mixes for the Y Bus (YM0, YM1, or YM2) where the "M" stands for mix. By default, WM0 and YM0 are routed to Output T of the matrix mixer, so we will keep that default routing and use the WM0 and YM0 mixes for this example.

PRESETS



In order to permanently save the settings to the EF2201, you must use a User Preset. Here, we've used Preset 16, although you may use any of the User Presets 16-47 to accomplish this task. We've also renamed User Preset 16 to Conference Room. Once the User Preset has been saved, you must also change the Power on Preset to reflect the proper Preset that you want the unit to power up to if the unit loses AC power.

Technical Support

For support on the Vortex product line, call toll-free (USA/Canada) 888-248-4143, then select option 1, then option 3.

For exclusive Integrator and Consultant focused support (through our PASS program), dial 1.408.474.2048; this number will get you help on video and Vortex products.

For general technical support, dial 1.800.POLYCOM

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